

The Chemical Age

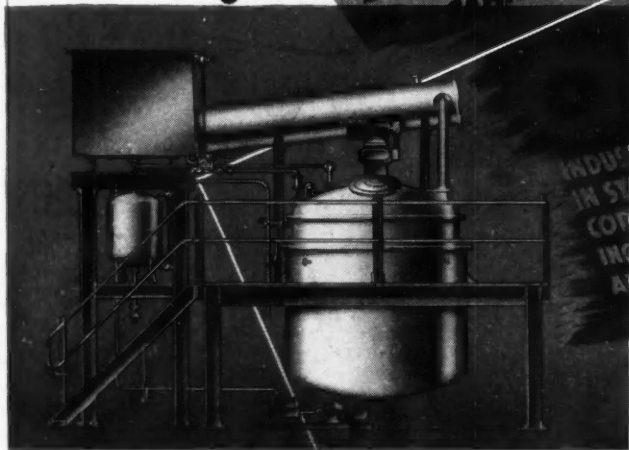
Weekly Journal Devoted to Industrial and Engineering Chemistry

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No. 1408

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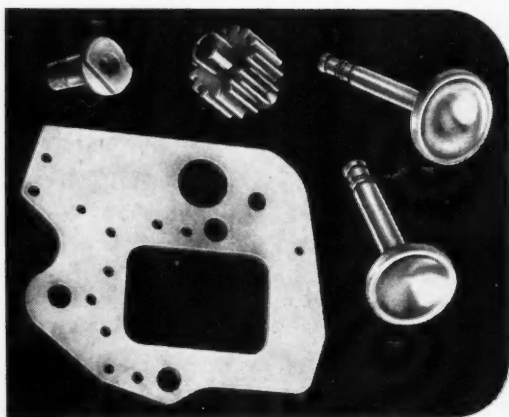
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A high proportion of the British aircraft that carried a message of doom to Germany incorporated in their construction parts made from Edgar Allen stainless steels. A few examples are shown herewith. Valves, gears, slip bomb release parts, etc., were only a few of the many different applications for these steels in war. Now that peace has come, the products of Edgar Allen's Stainless Steel department are being applied to more fruitful tasks. Parts of chemical plant, dairy plant and production machinery, ornamental work, acid and corrosion resistant vessels, tanks, etc., all are being made from one or other of the eight types of stainless steels made by Edgar Allen & Co., Limited, who also make five types of heat resisting steel. A comprehensive booklet describing these stainless steels has been prepared and will be sent to those interested. Name and address should be given, and an indication of the firm concerned.

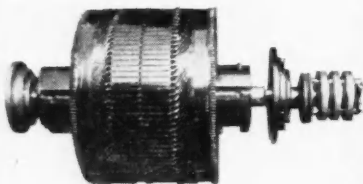
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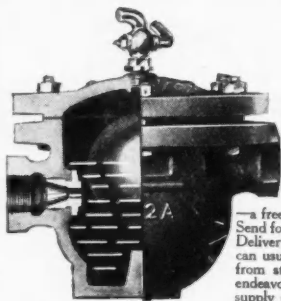
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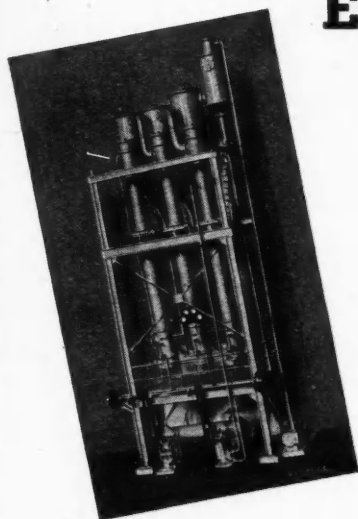
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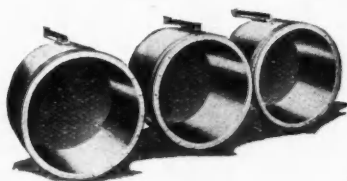
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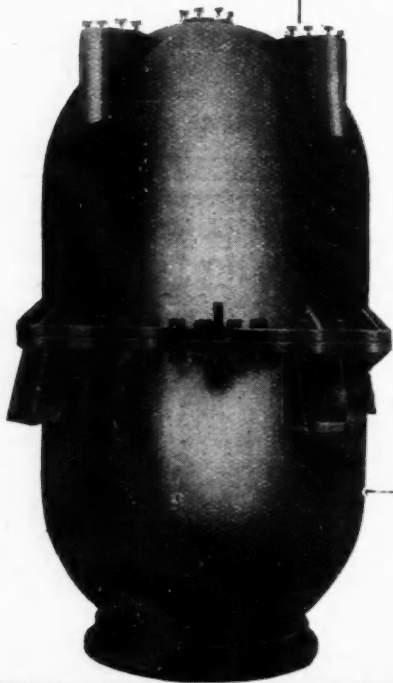
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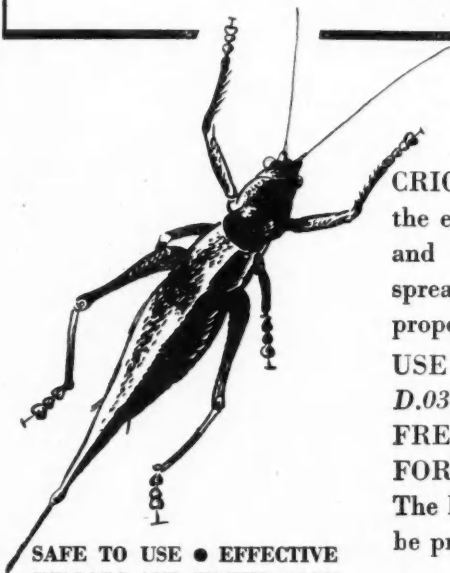
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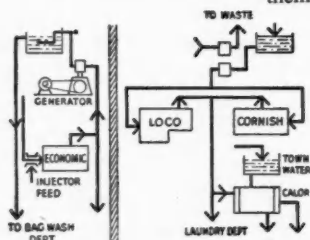
of being independently supplied to several separate points of consumption and the surplus going to waste, heat is circulated and re-circulated from point to point so long as there is work for it to do.

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FOR GENERAL INFORMATION see Fuel Efficiency Bulletin No. 21 (The Construction of a Factory Heat Balance).

FOR SPECIFIC ADVICE and guidance contact your Regional Office of the Ministry of Fuel and Power.



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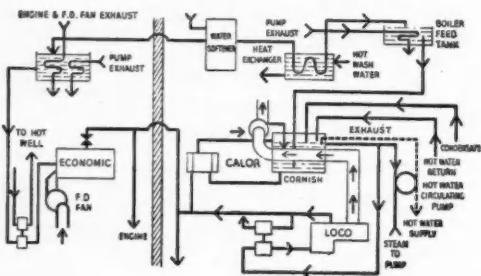
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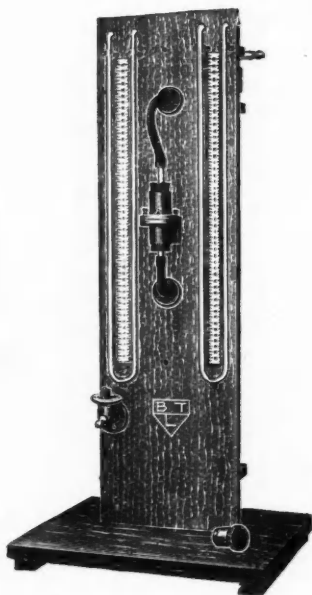
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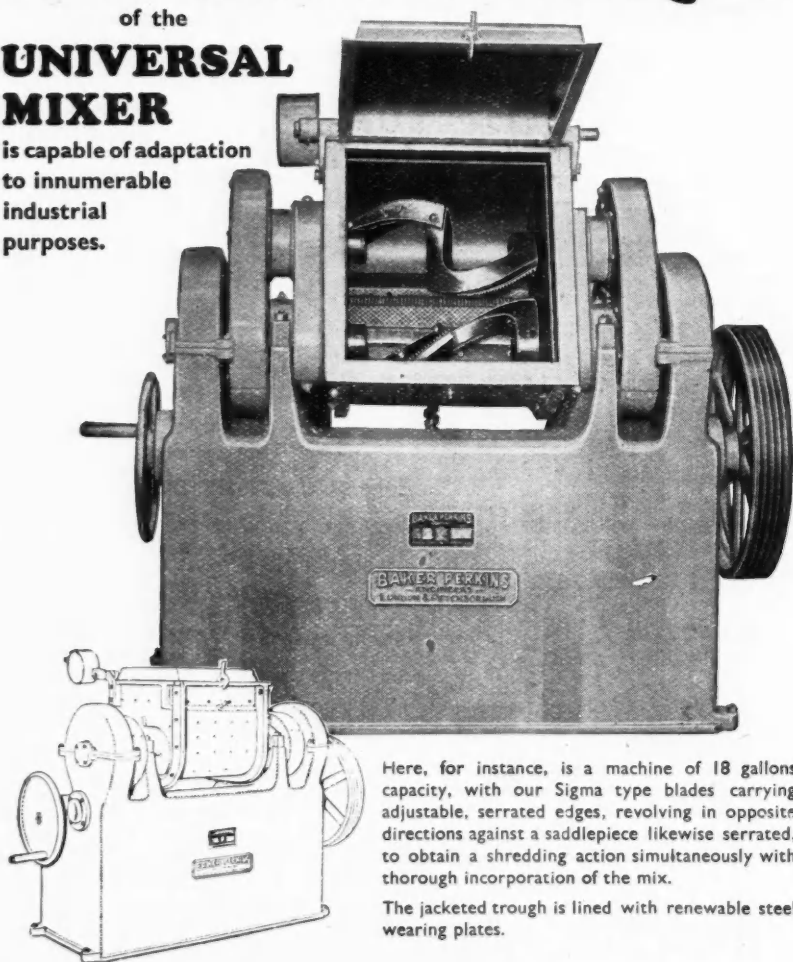
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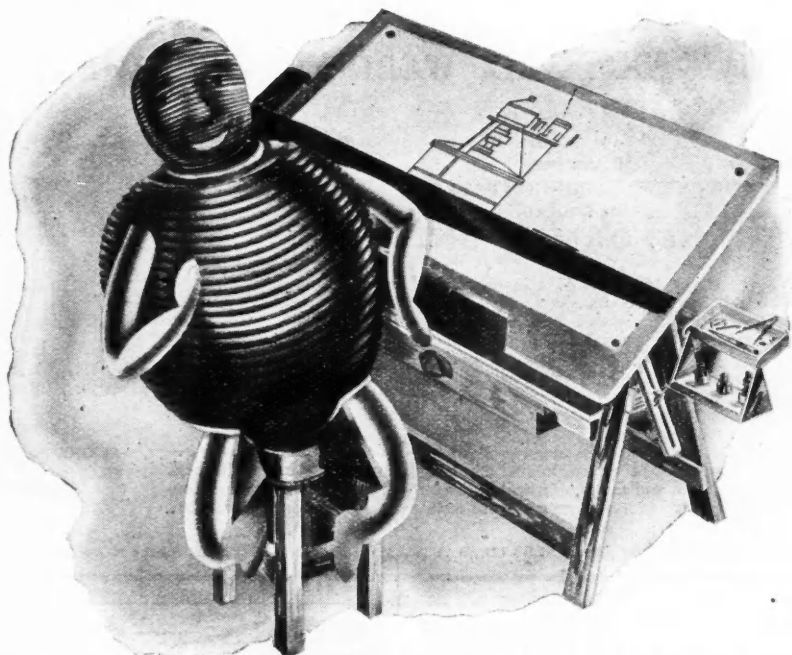
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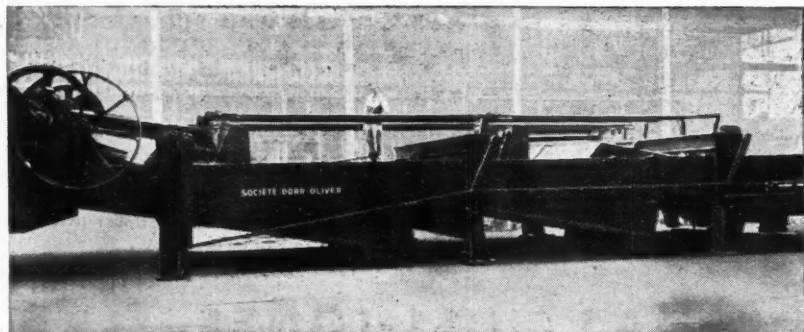
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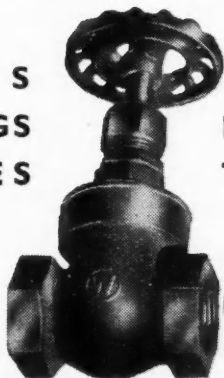
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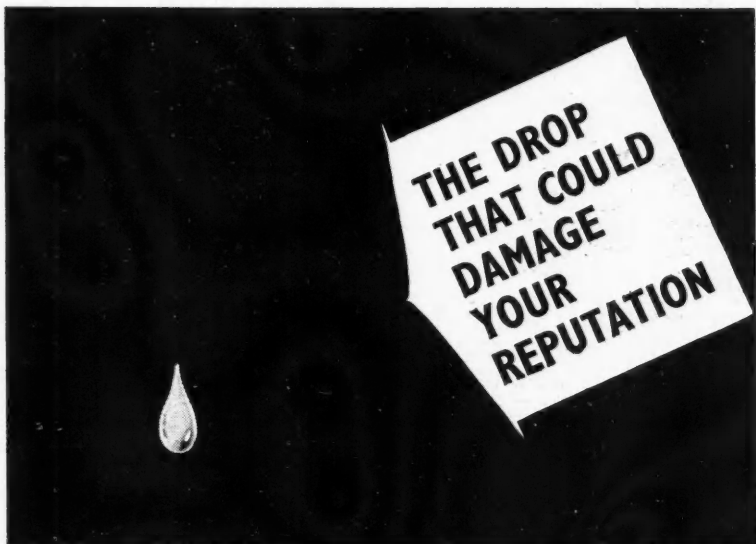
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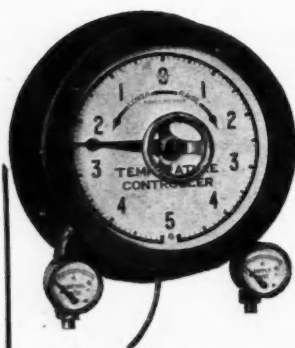
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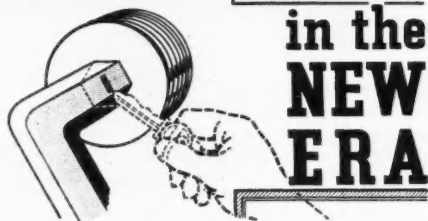
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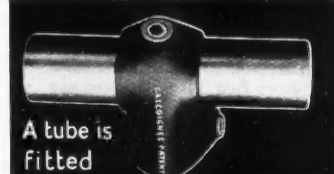


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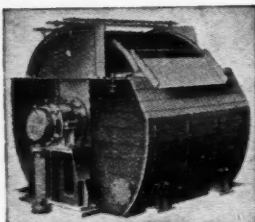
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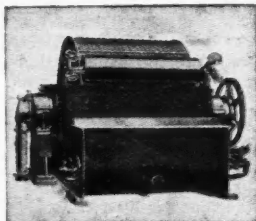
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The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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More About Cast Iron

WE ventured, in our issue of May 4, to make some observations on the iron-founding industry. The interest of our readers in that industry is twofold. Many, perhaps the majority, are users of cast iron equipment and are desirous of getting supplies of the best quality, within a reasonable time, and at the lowest cost. Others, the plant manufacturers, may themselves operate foundries, and will thus have an even closer interest in anything that concerns the well-being of the art and practice of iron-founding. We had the temerity to suggest that an industry with an output of 2½ million tons of castings in normal times seemed to dissipate its energies by dividing this production among no less than 1750 firms. We pointed to the undoubted and acknowledged difficulty of persuading young men to enter this industry, as possibly indicating that modernisation of plant and methods might be needed to bring an ancient craft into line with present-day methods of production.

The report of the Joint Iron Council to the Minister of Supply has given what may be termed the official view of the industry upon our suggestions, and has added considerably to the public appreciation of the difficulties under which the industry is labouring. It is true that the output of

2½ million tons of castings is divided between 1750 firms, but of this about 75 per cent. is concentrated in 350 firms. Iron-founding appears to be one of those trades, like boiler-making, which can be started with little capital or equipment provided one has the necessary skill. Many of our engineering firms have been started by a man with his sons or a couple of assistants fitting some tools into a shed and then going round to local works and seeking orders. The orders obtained, they return and make the goods ordered, collect the money on delivery, and seek further orders. From these small beginnings have sprung great firms; we should be the last to suggest that anything of this sort should be stopped. There are many foundries, hundreds of them, owned by enterprising artisans who have set up in business. A

good many of these men have been returning from the Forces lately and have again started in business in this small way. They provide a useful service to the community which the larger foundries cannot undertake; they use family labour, and they can undertake odd jobs that the big foundry with high capital charges and equipped for mass production could not do at any reasonable price. Conditions in these foundries are

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not unnaturally rough, but the whole thing is an adventure in which the individuals concerned are keenly interested, caring nothing about the hardships involved. We say, if a small man under these conditions can keep going and build up his business, good luck to him. His ability to do so is clear evidence that he is doing something which other concerns cannot do equally well and that he is performing a useful national service. If it were otherwise the bigger concerns would swamp him and he would go out of business.

This, however, does not remove all doubts as to whether the larger units of the industry have developed modern methods to the maximum possible degree. We are informed that during the past quarter of a century there has been a process of grouping within the foundry industry which has resulted in concentration into larger units with a view to obtaining the advantages of rationalised production and enabling schemes to be planned beyond the capacity of a single foundry. During this period also methods of continuous or mass production, which proved so successful in the engineering industry, have been developed and applied. The application of science has brought about something akin to a metallurgical revolution in iron-founding. Means have been provided for the much closer control of foundry operations, and this in turn obviously leads to improved products. A policy of standardisation of both quality and dimensions has been pursued through the British Standards Institution. Among the developments which have taken place may be mentioned the production of cast irons with special properties for particular applications, non-magnetic, corrosion-resisting (including the highly acid-resisting silicon iron), heat-resisting, abrasion-resisting, and wear-resisting; cast irons of high strength and toughness, for such purposes as camshafts and crankshafts; the application of centrifugal castings; the development of die-cast irons; the further evolution of chilled rolls and malleable cast irons—all of which enlarge the scope and increase the importance of the industry.

The threat of nationalisation hangs over the foundry industry. The Joint Iron Council is quite convinced that the present organisation of the foundry industry is sound. In the Report to the Minister it is stated by the organisation that

"transport costs are kept low, and among the other benefits which accrue is that of quick personal contact and close understanding between supplier and user. The existence of a large proportion of comparatively small foundries is due to the fact that the engineering and other industries served by iron-founders are themselves spread over the whole country. It is not possible for the Joint Iron Council to recommend any fundamental changes in the general location of foundries. It is believed that, in the main, those factors which determine present locations remain largely unaltered and are unlikely to change in any marked respect. Where change is required local initiative may, as hitherto, be relied upon for effective action."

If these facts can be substantiated, as no doubt they can, it would appear that there is no ground whatever for nationalising the foundry industry nor indeed would it be possible to do so. An industry which can support hundreds of very small firms may be frowned upon in a totalitarian State, but with the decreasing opportunities for small business we should be sorry to see any curtailment of the present scope for individuals who start out hopefully in a spirit of adventure. Britain needs more of this spirit to-day, now that we are faced with a disinclination to work on the part of so many of our people.

That the foundry industry is well equipped to face the future is shown by the active research which is being conducted through the British Cast Iron Research Association. Many firms within the industry have their own research laboratories also. We are informed that the Joint Iron Council plans to do everything within its power to stimulate research and its application to the iron-founding industry, and that much attention has already been directed towards that objective. There are in hand, or proposed, numerous schemes for the extension or inauguration of research. The development of special cast irons for chemical and other purposes has been a major contribution by the metallurgist to the foundry industry within recent times. In default of any information to the contrary, it seems inevitable that we must accept the view of the Joint Iron Council that the foundry industry is well organised, and that no major change can with advantage be undertaken at the moment.

NOTES AND COMMENTS

Exhibits and Research

AFTER six years of frustration, the urge to discuss and to display the productions of scientific ingenuity is at last being given free rein. On a later page of this issue we give some description of the remarkable exhibition staged by Johnson, Matthey & Co., to illustrate the progress they have made in scientific industry during the war, while last week was the turn of the I.C.I.'s highly successful effort to bring home to the public the magnificent work done in chemical research. It was at the opening of this I.C.I. exhibition that Sir Robert Robinson, P.R.S., took the opportunity of expressing his wise and considered views on the immediate future of chemical research in this country; and at the outset he made an excellent point when he stressed the unstable character of chemical industry. In such a field, he said, where there is continuous evolution, and even revolution, research is new blood indeed. The pressure nowadays is such that we have to make fresh discoveries if we are to exist at all. Therein, he indicated, lay the value of the exhibition, as each of the selected topics represented, not a mere technological improvement, but a technical advance resulting from scientific research which had uncovered really new knowledge.

The Past and the Future

AMONG the most interesting features of Sir Robert Robinson's address was the information he was able to supply about the work of chemical researchers during the war. One of their most conspicuous successes was in the field of chemical warfare—an apparently negative victory which it is hard for the public to appreciate at its true value. As in the Sherlock Holmes story, the remarkable thing was that the dog did not bark! After the fall of France, as Sir Robert said, the enemy must have become pretty well acquainted with our progress in chemical warfare, and the thesis that the Nazis were deterred from starting this type of frightfulness out of respect for the Geneva Convention will find few advocates. That is all very well for the past. For the future we must enlarge the scale of our scientific effort in order to be able to cope with the task of reconstruction. Most of us will agree with Sir Robert that the present rate of progress in scien-

tific education is quite unsatisfactory. Where are the new Technical Colleges of university rank that should now be on the stocks? What is the use of increasing the number of students without supplementing the accommodation? Sir Robert is no mere destructive critic, however; he has a feasible plan, and he claims that the teachers to implement it are available. Cut out the palatial laboratories, he suggests, and "improvise, possibly with army huts as we have done before in many places, and use existing laboratories for higher study and research." The idea is simple and appears effective; and if the exhibition does nothing else than gain consideration for this plan, it will have achieved a notable success.

Unworked Tin Areas

REFERENCE was made in these columns last week (see p. 660) to the proposed setting up of a Departmental Committee to examine the position of the Cornish tin-mining industry and to make recommendations as to its future. It was stated that the results of war-time prospecting had proved disappointing, but it has since been pointed out by Mr. F. Lyde Caunter, vice-chairman of the Cornish Tin Mining Advisory Committee, in a statement to the *Financial Times*, that the Government was handicapped during the war by the extreme urgency to obtain tin quickly at any cost and that moreover there was a considerable shortage of labour and machinery. The Ministry of Supply was unable to consider any schemes which could not be brought into production within twelve months. These factors militated against the development of mines of any depth. The tin stock position of the United Nations was such by 1943 that there was no need to continue operating new concerns, which were, therefore, then closed down. Although most of the old mines are not economic to-day, some are considered profitable, even at the present increased costs. At a recent meeting of the Institution of Mining and Metallurgy, Mr. Brian Llewellyn stated that as a result of a survey of the deeper tin zones of the Carn Brea area, he reached the conclusion that there remained an extensive mineralised area which warranted exploration and that the potential value of the tin ore alone in this area was about £50,000,000.

Argentine Linseed

MR. STRACHEY, to judge by his remarks in the Commons about a fortnight ago (see *THE CHEMICAL AGE*, June 8, p. 648), evidently had a shrewd suspicion of the way things were going with the purchase of Argentine linseed oil, though he was apparently misinformed when he suggested that the Russians had so far been unable to secure an appreciable supply. It now appears, according to the Buenos Aires correspondent of *The Times*, that 7000 tons of linseed oil had already been loaded into Russian tankers at that port before June 11, and that one of the vessels sailed on June 9 for Leningrad. The Argentine Government had agreed not to sell linseed oil to anyone outside the Combined Food Board (of which Russia is not a member), but evidently the price offered by the Russian Government—between 60 and 70 per cent. above the Board's price—afforded too great a temptation. It is further stated that the oil was loaded by night, minus any of the usual documents by order of the president of the Argentine Central Bank. Perhaps the Combined Food Board ought to regard these subterfuges as a compliment to its vigilance, if not to its authority.

Chrome Ore in Indo-china

AN example of how the numerous little semi-civil wars now being waged in various parts of the globe can hold up the production of valuable raw materials is afforded by a note in *Chimie et Industrie* (1946, 55, 306) relating to chromite in Indo-china. It appears that about 1918 certain alluvial deposits rich in chrome ore were discovered about 12 or 15 miles south-west of Thanh-hoa, capital of the northernmost province of Annam; and ten years later five mining concessions were established to exploit the mineral content of the serpentine rocks from which the chrome was derived, over a block nearly 20 sq. miles in area. Both the alluvial sands (to a depth of about 30 ft.) and the undecomposed serpentine were found to contain from 2 to 3 per cent. Cr_2O_3 , which could be enriched on the spot to 50-52 per cent. Electric power was employed, with a labour force of some 250 coolies, and in 1930 an output of 1451 metric tons of ore was extracted, with a Cr_2O_3 content of 740 tons, increased in 1931 to 2780 and 1404 tons respectively. History, so far as it is available to us, does not relate what has

occurred since 1931, but it appears that a considerable tonnage of ferrochrome is now in existence at Thanh-hoa, ready for use as soon as local conditions allow.

Chemistry and the Press

FOR some time past there has been a feeling among chemists that their science was not enjoying its full share of gratitude, on the part of the general public, for services rendered. In some quarters there has been a tendency to blame the Press for this—not sufficient recognition of chemical achievements, inaccuracy of reports, and so on. It is now being admitted, however, that the blame must be shared, and a genuine attempt is being made to explore the possibility of more satisfactory relations between chemists and pressmen. On Tuesday, representatives of the National and Provincial Press were invited by the Chairman of the Chemical Council to a lunch-conversation at which the question might be threshed out; and at all events a beginning has been made, even though the points raised so far have been elementary from the journalistic point of view. A similar discussion between the Chemical Society and members of the Technical Press will be going on even as we go to press, when the matter may perhaps be taken a stage further.

A Centre of Information

GENERAL agreement was reached on the principle that some sort of information centre should be instituted, where pressmen could look for answers to their queries on chemical subjects; and it would appear necessary that someone in the nature of a Press Officer should be appointed to prepare material—not merely "hand-outs"—about chemical events in such a way that news editors might be able to deal with it acceptably. Whether the scientists like it or not, the public loves to attach a personality to a story; and our chemists may have to sacrifice some of their cherished anonymity. To our mind, however, the great difficulty will be to find an Admirable Crichton who is sufficiently conversant with chemistry to appreciate the true significance of a chemical achievement, and at the same time closely enough in touch with the layman to interpret it. If there is such a man, he will be able to do great service both to science and to the public in general.

Superphosphate Manufacture

A New Continuous Process

by SVEN NORDENGREN*

ALTHOUGH more than a hundred years have elapsed since superphosphate was first manufactured, the industry can still report both progress in the manufacturing process and improvements in the design and construction of mixing units. The mixing of ground phosphate rock with a quantity of sulphuric acid appears to be a very simple process and it might be expected that its chemistry would have been thoroughly investigated long ago: but this is not the case. The nature of the apatite molecule, the carrier of the phosphorus both in apatites and phosphorites, has been known for only a few years. In 1926, the author, believing the calcium sulphate in superphosphate to be present as gypsum, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, tried to remove the water of crystallisation, with a view to obtaining a product of higher phosphoric acid content. It was then found, probably for the first time, and contrary to general belief, that the calcium sulphate was present as anhydrite, CaSO_4 .

The mechanism of reversion due to iron content of the raw materials has not yet been satisfactorily explained. That the porosity of the newly-mixed superphosphate should not be destroyed is generally agreed, but our knowledge of the chemical reactions affecting the physical structure of the final product is still incomplete. With increasing knowledge of the physico-chemical reactions it seems certain that improved mechanical equipment will be devised.

Early Intermittent Processes

At the beginning of this century, when the weighing of phosphate rock and the measurement of the acid were still effected by hand, the first mechanical dens or chambers in which the superphosphate developed into a solid, were constructed by *Wenk, Milch, Beskow, and Thorsell* (Svenska). These processes were all intermittent in operation, but constituted a definite improvement on the hitherto manually-operated dens. Shortly afterwards, the first continuously-operated den was constructed by *Forbis*, while another type, patented but never built, was proposed by *Bruhn*.

In the 1920's a remarkable contribution was made by *Velish*, of Zagreb, Yugoslavia. Being convinced that the method of superphosphate manufacture in the future would be in the nature of a continuous process, he tried to cover by patents all possible solutions of the problem. But nothing

tangible emerged from this attempt. The first modern continuously-working unit was the *Broadfield*, followed shortly afterwards by those of *Standaert-Moritz* and *Marwell*. Both the *Standaert-Moritz* and the *Maxwell* constructions had been anticipated by *Velish*, while a novel construction was the autoclave process of *Ober*.

Problems of the Continuous Process

The making of superphosphate by an automatic, continuous process necessitates the solution of two main problems: the automatic weighing or measurement of the raw materials, and the handling of the newly-mixed reaction mass until it solidifies. Both these problems are of major importance. The process now to be described embraces methods not hitherto foreshadowed in any patent. The phosphate rock is weighed and a quantity of acid measured by an electrically-controlled automatic device; the newly-mixed sludge solidifies in a specially constructed vessel, where it remains for a very limited period. This greatly facilitates the construction of the maturing chamber, as the product is introduced to this chamber in solid form.

The apparatus for the process can be divided into three main parts; the mixer, which in a few seconds thoroughly mixes the raw materials; the solidifying vessel, in which the reaction sludge thickens and finally becomes solid; and the chamber in which the maturing takes place. In the mixer, only part of the mineral acid has time to react, forming phosphoric acid; in the solidifying vessel the formation of phosphoric acid is continued until practically the whole of the original acid has been consumed; the phosphoric acid reacts simultaneously on the remainder of the phosphatic material, forming mainly monocalcium phosphate. Solidification in the superphosphate and double superphosphate processes depends upon the diminishing quantity of free phosphoric acid and the increasing quantity of solid compounds, particularly monocalcium phosphate, and not less so on the evaporation of water. Small quantities of water will also be taken up as water of crystallisation by the monocalcium phosphate, but this crystallisation takes place largely in the chamber, where, during the maturing process, the free phosphoric acid largely disappears. The time factor in the mixer should be 2.5 seconds, in the solidifying vessel 5-20 minutes, and in the chamber 1-3 hours.

This method differs considerably from

* Landskrona, Sweden.

those superphosphate processes in which double mixers are used, *e.g.*, those which employ a rapidly-revolving screw mixer followed by a slow-operating screw or two slow-operating screws working in unison. In the method under discussion mixing is effected exclusively in the mixer, and it is important that the product should be undisturbed, so that the chemical reactions can develop unaided. In this way a product of the best quality can be produced. If phosphate rock is mixed with a mineral acid, carbonic acid, fluorine gases, and water vapour are evolved, leaving a porous cake. It is not yet clear how the quality of the product depends on the porosities of the cake, but it is generally conceded that it will assume quite different properties if the pores are destroyed.

Preserving Porosity

During solidification any decrease in porosity should be avoided, and thus it is important that some method should be devised, particularly if the process is to be a continuous one, for moving the reaction mass from one end of the solidifying chamber to the other with the least possible kneading effect. It was found that slowly-working cast-iron paddles achieved this end most satisfactorily. As solidification proceeds, much of the reaction mass adheres to the walls of the vessel and propelling tools. Consequently, the paddles, which are mounted on a rotating shaft, are constructed in such a way as to be self cleaning, while at the same time they also serve to keep the walls and bottom of the chamber free from adhering phosphatic material. The chamber itself should be in the form of a shallow tray, lead-lined, or made of concrete or cast iron. A sluice at the outlet of the tray controls the volume of the reaction mass, and by this means the time allowed for the reaction is regulated.

As solidification proceeds the mass loses its mobility and adhering tendency. These characteristics make it possible to construct a maturing chamber that will allow the mass to be introduced and excavated without much difficulty. The chamber can be given the form of a prism of rectangular section with a movable floor. Such a floor could feed an iron segment belt, moving slowly towards the end of the chamber, where a rotating, scraping, and pulverising device can be arranged. The walls and roof of this chamber, if need be, can be stationary, and may be made of wood, brick, or concrete. Another type of construction would involve the employment of a chamber of annular form, where the bottom and the inner cylindrical wall would move together, while the outer wall and the roof remained stationary. This design differs from the Standaert-Moritz chamber, in which the bottom and the outer

wall are movable, while the inner wall and roof are stationary. The advantage of the former construction over the Standaert-Moritz design is that the scraper or pulveriser leaves the pulverised product outside the ring, which is more convenient in general manufacture.

Accurate Measuring System

Such a construction with a solidifying vessel or tray will permit an intermittent mixing of the raw materials, even if the maturing chamber is working continuously, as the tray will level the flow of the reaction mass. Intermittent mixing will greatly increase the accuracy with which the raw materials may be measured, and this in turn results in a better-quality product. It is found practicable to measure the acid with a bucket fastened to a rotating shaft. With each revolution of the shaft the contents of the acid bucket are emptied into the mixer. The weighing of an adequate quantity of phosphatic raw material is effected simultaneously in another bucket, which is so constructed that it may be tipped and emptied of its contents with the aid of a suitable attachment mounted on a steering shaft synchronised with the acid-bucket shaft. The phosphate bucket is suspended from the bridge of a weighing machine of ordinary type. The dial of this weighing machine is provided with a shade, or screen, and a photo-electric cell is placed in such a position that when a certain weight is reached, the lamp of the cell is darkened. The filling of the bucket is effected by two screws, one larger than the other. When the larger screw is working the dial rises until the photo-electric lamp is shaded, whereupon the motor driving the larger screw is automatically stopped. Simultaneously, the smaller screw is put into action and the dial continues to rise until the shade is clear of the lamp, when the rays again hit the photo-electric cell. The impulse then received stops the smaller screw. The weighing, which is very accurate, is now completed. The bucket is then automatically rotated and the phosphate discharged into the mixer. Simultaneously, acid is added in like manner. After a few seconds of intensive incorporation the valve of the mixer is opened, then closed automatically, and the next operation starts immediately.

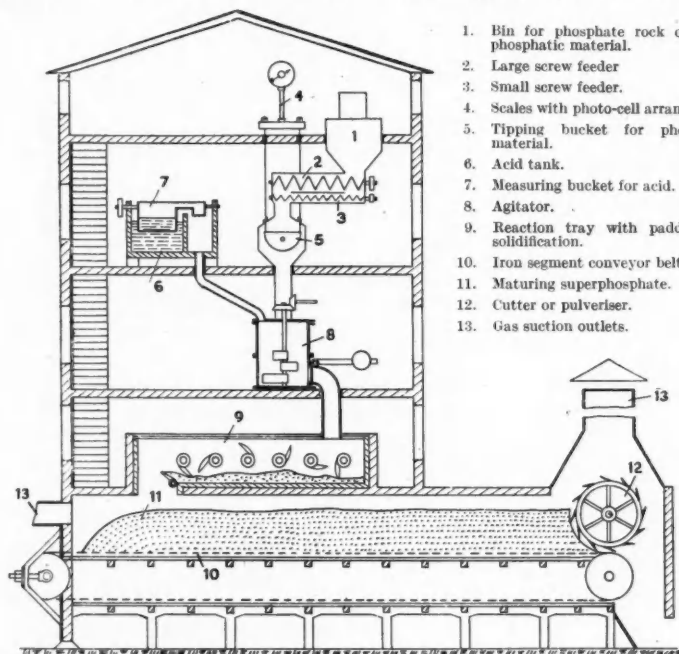
It has been found most convenient to mix two batches in about one minute. Should the weighing process not be, *com-* raw material, insufficient acid in the container, etc., the rotation of the controlling shaft is stopped by a suitable device in the electric circuit and an alarm signal sounded.

The accompanying diagram illustrates the main features of the plant.

After a full-sized pilot plant had been in constant use for a couple of years a unit

was built at Landskrona, in southern Sweden, with an output of 50 tons per hour. Owing to the slow rate of maturing of the superphosphate made from Swedish apatites,

to a maturing time of 3 hours. The power needed is, however, very small and the whole plant, with a yearly output of 220,000 metric tons, is operated by only one man per shift.



1. Bin for phosphate rock or other phosphatic material.
2. Large screw feeder
3. Small screw feeder.
4. Scales with photo-cell arrangement.
5. Tipping bucket for phosphatic material.
6. Acid tank.
7. Measuring bucket for acid.
8. Agitator.
9. Reaction tray with paddles, for solidification.
10. Iron segment conveyor belt.
11. Maturing superphosphate.
12. Cutter or pulveriser.
13. Gas suction outlets.

Nordengren superphosphate plant.

the maturing chamber was given very large proportions. The iron segment belt forming the bottom of the chamber is capable of carrying up to 150 tons, which corresponds

Another unit of similar capacity and output, but with the chamber constructed in annular form, is being built at Norrköping, south of Stockholm.

Exports to South Africa

Certificates of Essentiality

INFORMATION has been received from the Office of the High Commissioner for the Union of South Africa of a modification to the list of U.K. goods for which Certificates of Essentiality are issued by the South African authorities. The list of goods for which Certificates of Essentiality are now issued by the Union Authorities for imports from the United Kingdom includes the following. (Note.—To facilitate reference, articles have been grouped under the various Commodity Controllers:

Controller of Industrial Chemicals.—Acid,

citric; ammonium nitrate, ammonium phosphate and ammonium sulphate, commercial; muriate of potash (commercial potassium chloride); potassium sulphate, commercial; sodium nitrate, commercial.

Controller of Iron and Steel.—Terneplate; tinplate.

Controller of Non-Ferrous Materials.—Tin in bars, rods and ingots.

Controller of Soap and Oils.—Fatty acids; fish oils; oils and fats, animal and vegetable; oil seeds; soap and substances containing soap.

Stoneware Suction Filters

Notes on Batch Operating Technique

by "CHEMICAL ENGINEER"

THE frequent need to filter mixtures of liquid and solids which are acid in reaction, or otherwise corrosive, makes it highly desirable for all small chemical works to be equipped with filter vessels constructed of some good acid-resisting material, especially for working up intermittent batches of miscellaneous products. In this connection, one of the wisest decisions that can be made is to adopt chemical stoneware as the material of construction for open-top filters operated by suction. Stoneware does not contaminate the product which is handled and, apart from enjoying a useful life of practically infinite length, such vessels are easily cleaned and are almost immediately ready to deal with another product which may be entirely different in composition.

Various Designs

These stoneware suction filters are obtainable in more than one standard design to serve the particular wishes and convenience of the user. Some of them are made in one single piece of ware, with a separate perforated plate supported on a ledge moulded about half-way up the vessel; others are two-piece constructions, with the perforated plate forming part of the upper half, which joins the lower half serving as receptacle for the filtrate, the two halves being made vacuum-tight by a ground surface joint. One of these alternatives may be preferred when it is a question of removing small amounts of solid matter as waste from a more valuable liquid, whereas the other pattern may be chosen when the recoverable solids are valuable and the filtrate is waste.

Filtering is effected by the aid of a membrane laid upon the perforated plate, as in the common case of filtering liquid in the laboratory by aid of suction, using a Buchner filter. The filtering membrane may be of cloth or of paper; in the former case synthetic textiles are available which give remarkably good acid resistance compared with the common filter cloth which was for so many years supplied for use in filter presses.

As an alternative to the perforated plate, a special "stone" made of porous ceramic material is sometimes used; such stones are often preferred on account of the long useful life they have when continuously filtering the same chemical product. The filter stones are cut to shape to fit the filter vessel and are placed on top of the perforated plate in place of cloth or paper. The stones,

moreover, are obtainable in a range of standard porosities and in varying thicknesses to suit the character of the product to be filtered; this is one of their main advantages. Being made of siliceous material, they withstand the action of any acid but hydrofluoric; filtrations involving the latter are not easily carried out, except by use of filter vessels made wholly of some plastic which is immune from attack, such as phenol-formaldehyde resin, with filtering medium of asbestos or of a synthetic textile of the type of polyvinyl chloride, both suitably modified for the character of the acid to be handled.

The common filter-cloths are supplied in different grades; there are cotton and woolen cloths, as well as those woven from asbestos or from synthetic textile fibres. Cloths have the advantage of being easy to handle when washing is necessary. Wool cloths are more expensive than cotton, but are more suitable for acid filterings. Asbestos cloth is used generally in cases where both cotton and wool are quickly destroyed by the corrosive action of the product.

Value of Filter Cloths

Filter-cloths used as the sole filtering medium are of value only where a definite filter cake may be built up in the operation of filtering, i.e., where there are particles of solid matter or crystals capable of forming a layer of substantial thickness upon the surface of the cloth. In the case of a colloidal scum, filter-cloths are of little value unless they are used in conjunction with a "filter-aid," such as kieselguhr or diatomaceous earth, bone char, paper pulp, asbestos pulp, or hardwood sawdust. When using sawdust, care must be taken to ascertain that no contamination is likely to be extracted by the chemicals handled.

The filter-aid is mixed with the liquid-solid mixture before filtration, and in order that it may remain in suspension while being passed to the filter, it is necessary for it to be a material of light weight; kieselguhr, for instance, weighs about 8 lb. per cubic foot. The quantity to be used will depend on the amount of colloidal matter present, but in any case it is comparatively small and the additional expenditure involved is more than offset by the resulting increase in speed of filtration and better filtering effect obtained.

For a two-piece stoneware filtering vessel, a soft rubber washer can be used to provide a vacuum-tight joint at the ground flange

between the two halves of the equipment. This permits the dismantling of the filter without difficulty whenever needful; that may be rather often, if frequent cleaning is necessary as it is with products which may give colloidal deposits when residues are allowed to stand in contact with the air. In other cases, the upper and lower parts of the equipment are cemented together by aid of a putty composed of asbestos powder and silicate of soda, aided possibly by a further application of rubber cement. The most satisfactory general-purpose acid-resisting cement is made by mixing asbestos powder and silicate of soda of 40° Bé., sp. gr. 1.38, to the consistency of common putty. Rubber cement can be made by dissolving waste rubber in hot linseed oil and then adding a very small quantity of finely-powdered sulphur; this preparation should be made only when required for use, because, owing to the inclusion of the sulphur, it sets by a process of slow vulcanisation.

Fixing of Perforated Plate

The perforated plate is commonly supplied loose, and has to be fixed rigidly in position in the vessel for greater convenience and to prevent the passage of air at its periphery, with consequent loss of filtering efficiency. This is done by packing the annular space adjacent to the walls of the vessel with asbestos rope; the same procedure is necessary in fixing a porous filtering stone. In these circumstances it is easy for the asbestos to retain some of the liquid from successive filtering batches—a source of trouble when different products are handled in succession. Such trouble, however, can be overcome by coating the top of the asbestos packing with the asbestos-silicate putty already mentioned, which is smoothed flush with the surface of the porous plate; for this situation a hard-setting cement must never be used, because of the subsequent difficulty of removing the plate, and also on account of the risk of cracking the filter vessel when hot filtrations are in progress, different coefficients of thermal expansion applying to the two adjoining materials, and the resulting unequal stresses not being easily dispersed.

Stoneware suction filters must be capable of "holding" a complete vacuum. The initial flow of filtrate will be at its maximum speed; this speed decreases at a rate varying with different liquid-solid mixtures. For products of granular structure and relatively even particle size, or with a mass of crystals, the decrease in speed of filtration is rapid. A low degree of initial suction will greatly reduce any tendency for the filter cake to be built up in an excessively compact manner, and thereafter a higher average can be maintained.

If the cake is to be washed, there is a definite thickness at which the minimum

quantity of wash water will displace the mother liquor and simultaneously dissolve soluble salts from the filter cake. This thickness is best determined by experience for any particular product.

In operation, the vacuum pipeline is connected with the filter by a length of suction hose which is wired to the appropriate connecting nozzle on the lower half of the vessel; sometimes a flange coupling is provided, and used in conjunction with a split metal collar.

Intermittent Removal of Filtrate

To remove the filtrate intermittently it is necessary to provide a vacuum release valve on a T-piece inserted between the main valve and the point where the suction hose is connected to the vacuum pipeline. First the main valve is closed and the release valve opened, so that air passes into the lower part of the filter vessel. This operation is termed "breaking the vacuum." If the filtrate outlet be opened while suction is still applied, air would be drawn into the lower part of the filter vessel and, as a consequence, the flow of filtrate would be erratic. The provision of a vent in the wall of the vessel is sometimes desirable for breaking the vacuum by means of a small air-cock. The main valve is necessary to prevent air from going straight to the vacuum pump; such valves must be provided wherever the vacuum pipeline has a connection for suction hose.

The output of suction filters depends on several factors. It can be determined correctly only by actual tests, adopting a range of materials and different conditions of filtration as a tentative standard for future guidance. In general, it will vary with the nature of the product handled; the relative proportion of liquid and solids present; the particle size and shape of the solids, i.e., whether large or small crystals, a fine precipitate, or a coarse precipitate; the presence or absence of colloidal matter or slime; and similar factors.

Vacuum Gauge Readings

The reading on the vacuum gauge is a direct indication of the friction encountered in drawing filtrate and air through the filter-cake and the underlying filter-cloth or porous stone. As the thickness of the cake increases, there is increased resistance to the passage of the filtrate. In large vacuum filters operating continuously, a crystalline solid like coarse salt from brine evaporation will offer very low resistance to the passage of 40 cu. ft. of free air per min. per sq. ft. of filtering area, and the vacuum gauge will then usually indicate from 2 to 4 in. of mercury. Precipitated calcium sulphate offers considerably increased resistance; it allows the passage of little more than 1 to 3 cu. ft. of free air per min. per

sq. ft., and the vacuum gauge will indicate from 10 to 14 in. of mercury.

Cane-sugar mud is so finely divided that the passage of air is restricted to less than 0.5 cu. ft. per min., and here the gauge reading will be in the neighbourhood of 25 to 27 in. of mercury. With a slowly filtering material such as lithopone, even a large rotary filter will be capable of handling little more than 200 to 400 lb. of pigment per sq. ft. of filtering area per 24 hours.

A so-called "dry" vacuum pump of the piston type is preferable for providing the requisite suction, but a rotary vacuum pump can be used if one is already installed on an existing vacuum line. The size of the pump will vary with the nature of the material generally handled, *i.e.*, the degree of suction necessary, and is also dependent on the total filtering area which will be simultaneously in use. Calculations can be made on the allowance of 0.5 cu. ft. pump displacement per sq. ft. of filtering area for dense filter cakes built up slowly filtering pulp, rising to as much as 40 to 60 cu. ft. per sq. ft. in the case of crystalline products. Vacuum gauge readings are nearly always in inverse ratio to the volume of displacement.

The selection of the most suitable filtering medium is made by actual tests, or on the recommendation of makers of filter-cloth, filter-paper, or filter-aids. The firms supplying filter-aids have acquired a considerable amount of experience from users of their material, which is willingly put at the disposal of those with intricate filtration problems.

The main uses of suction filters made of acid-resisting chemical stoneware fall into three categories. They can be used: (i) in separating precipitated products from the residual liquor as in common manufacturing operations; (ii) for draining crystalline products from mother liquor and subsequently washing the crystals to remove adhering liquor or impurities; (iii) for preparing chemical solutions free from undissolved or suspended matter by feeding chemical into the upper part of the filter vessel (prepared with filter-cloth as for filtration) and then allowing water or other solvent to percolate without applying suction. Where compact filter-cakes are obtained in the normal course of filtering practice, the cake (after washing) can be dried by using suction to draw warm air through it before removal from the filter.

The most recent issue of *The Welder*, published by Murex Welding Processes, Ltd., Waltham Cross, Herts, contains much of interest, including an article on all-welded destroyers, and another on welding inspection.

Chemical Society's Centenary

Celebration Committee Formed

THE Council of the Chemical Society has announced its intention to celebrate next year the centenary of the foundation of the Society. This event, which was due in 1941, is likely to be one of the most important in the Society's history and will be of particular interest to all British chemists. It is proposed that the celebrations should occupy three days, July 15-17, 1947, and many distinguished overseas chemists are being invited. The intention is to arrange a series of special events, both social and scientific, which will include an exhibition to illustrate the Society's history; and it is expected that the Eleventh International Congress on Pure and Applied Chemistry will take place immediately after the Society's centenary celebrations.

An executive committee to make arrangements for the celebrations has been set up and has already begun its work; it is assisted by sub-committees dealing with special aspects of the arrangements.

The Committee Members

The membership of the Executive Committee is as follows: Professor C. N. Hinshelwood (President of the Society) as Chairman, Dr. M. P. Applebey, Mr. A. L. Bacharach (chairman of Publicity Sub-committee), Dr. G. M. Bennett, Dr. F. H. Carr, Mr. S. E. Carr, Professor J. W. Cook, Dr. C. J. T. Cronshaw, Mr. F. P. Dunn (treasurer of the Society and chairman of Finance Sub-committee), Sir Alfred Egerton, Professor A. Findlay (chairman of Meetings, Entertainments and Social Functions Sub-committee), Professor C. S. Gibson, Professor J. M. Gulland, Sir Ian Heilbron (chairman of the Reception, Membership and Accommodation Sub-committee), Lady Heilbron (chairman of the Ladies' Sub-committee), Professor D. H. Hey (honorary secretary of the Society), Professor E. L. Hirst, Professor C. K. Ingold, Dr. L. H. Lampitt, Dr. R. P. Linstead, Professor T. S. Moore (chairman of the Centenary Volume Sub-committee), Sir Robert Pickard, Mr. H. V. Potter, Mr. J. Davidson Pratt, Professor E. K. Rideal, Sir Robert Robertson (chairman of the Exhibition sub-committee), Sir Robert Robinson, Dr. F. Roffey, Professor N. V. Sidgwick, Dr. J. L. Simonsen (honorary secretary of the Society), Professor A. R. Todd, Professor W. Wardlaw (honorary secretary of the Society), with Dr. D. C. Martin (general secretary of the Society) as Secretary.

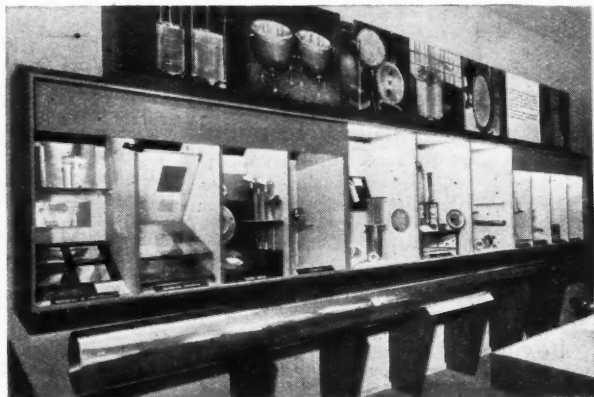
Johnson, Matthey's Enterprise

Comprehensive Exhibition

RATHER than wait to stage an exhibit at the first post-war British Industries Fair, Johnson, Matthey & Co., Ltd., Hatton Garden, London, E.C.1, have seized time by the forelock and are holding an exhibi-

ments, electronics, switchgear, resistance welding and low temperature brazing); a chemical division; ceramic division; jewellery and allied trades division; dental, surgical and optical group; and a historical section.

The chemical plant division at the Johnson, Matthey exhibition. Beneath the show-cases is seen the 17-foot silver tube used as a liner for a high-pressure reaction vessel.



tion of their own at Dorland Hall, Lower Regent Street, London, S.W.1. The exhibition, which is the first of its kind the company has held, was opened last week and will continue until June 26.

The company deserves commendation, not only for its initiative in providing an opportunity for its specialised products and services to be seen as a comprehensive whole, but also for its determination in overcoming difficulties inherent in an exhibition held at a time when many materials are still in short supply. Careful planning beforehand has ensured the maximum benefit from the space available, and smooth team-work has resulted in an exhibition which must bring as much satisfaction to the organisers as to visitors.

Perhaps the first thing that will open the eyes of visitors is the wide range of industries that come within the scope of the company's activities. These begin with the refining of metals and follow on with alloying and fabrication, which involve a variety of chemical and mechanical processes. Although originally specialising in the working of silver, gold, and metals of the platinum group, the company has enlarged its range of products in the past 25 years to include specialised base metal alloys designed to meet unusual requirements. The exhibition is thus arranged in several sections: an industrial division (which incorporates chemical plant and apparatus, instru-

The resistance of silver and platinum to attack by a wide range of active reagents, together with their useful mechanical properties and, in the case of silver, its excellent thermal conductivity, are emphasised in the chemical plant and apparatus section. Silver, or silver-lined, plant on view includes stills, jacketed pans, condensers, liners, agitators, tubes, cocks, and pipe fittings. Perhaps one of the most striking exhibits in this category is a tube of fine silver, which is claimed to be one of the largest ever produced, it is 17 ft. long and 11½ in. in diameter, with a wall thickness of ¼ in., and is used as a liner for a high-pressure chemical reaction vessel. The use of platinum in chemical plant is exemplified by agitators, sulphuric acid sprays, glass melting crucibles, and jets for fibre glass production.

The chemical division is devoted to the simple and complex salts of silver, gold, and the platinum metals, for which there is growing application, for example, in catalysis, in electroplating, in ceramic colouring matters, in pharmacy, and in the analytical and research laboratory. A special silver nitrate feature is included and other silver salts exhibited are the chloride, dichromate, iodide, oxide, permanganate, and resinate, among others. Gold salts, which are given a separate display, include simple and complex cyanides and other salts, such as gold-sodio-chloride, chlorauric

acid, gold-potassium bromide, gold-potassium iodide, gold sulphide and purple of cassius. There is an extensive range of the salts of platinum, palladium, iridium, osmium, and ruthenium, and a number of the precious metal salts available for plating. Another group of products which find a wide employment in industry are the rarer and minor metals, such as beryllium, bismuth, cadmium, mercury, molybdenum, selenium, tantalum, and tellurium. Of particular interest to those engaged in scientific and industrial research is the section devoted to standardised substances for spectrographic and chemical analysis.

German Technical Reports

Particulars of Latest Publications

SOME of the latest technical reports from the Intelligence Committees in Germany are detailed below. Copies are obtainable from H.M. Stationery Office at the prices stated.

BIOS 243. *I.G. Hoechst, Inorganic Division:* Manufacture of sulphuric acid, sulphite products and chlorosulphonic acid (3s. 6d.).

BIOS 256. *Phosphoric acid and sodium phosphates in Germany* (4s.).

BIOS 260. *I.G. Ludwigshafen:* Manufacture of sulphuric acid, sulphite products, liquid sulphur dioxide and cyanides (4s.).

BIOS 296. *German non-ferrous (copper-base) foundry industry* (11s.).

BIOS 375. *The wrought light alloy industry in the Ruhr* (6s. 6d.).

BIOS 392. *Welding of aluminium and aluminium alloys with particular reference to the manufacture of pressure vessels* (3s.).

BIOS 395. *German fluorescent lamp industry and phosphor chemical manufacture* (8s. 6d.).

BIOS 402. *Rolled non-ferrous metal industries in Germany* (9s. 6d.).

BIOS 422. *I.G. Ludwigshafen:* Sodium hydrosulphite and related compounds (3s.).

BIOS 423. *Deutsche Gold und Silber Scheide Anstalt (Degussa) — Frankfurt:* Report on organisation, research activities and production of sodium cyanide, soda-mide and potassium ethyl xanthate (4s. 6d.).

BIOS 425. *I.G. für Chemische Industrie, Gelsenkirchenschalke* (a controlled subsidiary of the I.G.): Manufacture of carbon bi-sulphide (1s. 6d.).

BIOS 440. *Mesamoll plasticisers for polyvinyl chloride* (1s.).

BIOS 448. *Manufacture of sulphate of copper in Germany* (1s.).

BIOS 468. *I.G. Oppau-Ludwigshafen:* The manufacture of synthetic crystals (1s.).

CIOS XXX-103. *I.G. Farben Works, Ludwigshafen and Oppau:* Fuels and lubricants (11s. 6d.).

FIAT 406. *Non-ferrous metal rolling mill practice in Germany* (3s.).

FIAT 426. *Interrogation of Dr. Pier and staff, I.G. Ludwigshafen-Oppau:* Miscellaneous information of interest to the petroleum industry (4s.).

FIAT 431. *Survey of the chloriae and caustic plants in Western and Southern Germany* (4s. 6d.).

FIAT 437. *Stickstoff-Syndikat G.m.b.H. Ramholz über Vollmerz, near Schluchtern:* Production and use of nitrogen fertiliser in Germany (1s.).

FIAT 478. *Coal-tar creosote for wood preservation during the war period* (1s. 6d.).

FIAT 480. *German wood preservatives other than coal tar creosote for the war period* (3s. 6d.).

FIAT 488. *Polymerisation of ethylene* (2s. 6d.).

Air Liquide Report

American Interests Expanded

AT the recent annual meeting of Air Liquide, the well-known French chemical group, the board put before its shareholders interesting details about developments in 1940-44. While net profits amounted, until 1943, to an average of 75,000,000 francs, there was a decline to 9,000,000 francs in 1944, and no final figures have as yet been made public for last year. Dividends for the period under review amounted to roundly 30 francs, and in spite of the fact that the company was cut off from its widely scattered foreign subsidiaries, the rate of distribution was maintained throughout, an illustration of the financial strength of the parent company.

The appreciable expansion that has taken place in the company's American production units is worthy of note. A number of new oxygen and acetylene works have been established in Canada, at Hamilton, Moncton, Sorel, and Montreal, while in the United States a new subsidiary, Spaco Incorporated, has been registered in order to integrate the group's entire interests in the United States and in Argentina. In the latter country, considerable expansion both in production and distribution has occurred.

The subsidiary in Egypt, which had been put under custodianship during the war, has recently been returned to its owner, and the Italian and Greek members of the French parent company have also regained their independence. On the other hand, the ultimate fate of Air Liquide's important subsidiaries in Poland, Czechoslovakia and Hungary is still in the balance, but the board does not appear to be unduly pessimistic regarding the various nationalisation measures in Eastern and Central Europe.

Catalytic Purification of Coal Gas

Visit to Gas Light & Coke Company's Works

IN conjunction with the annual meeting of the Institution of Gas Engineers earlier this month, a number of interesting functions were arranged, the majority of these being the specific concern of the gas industry. Industrial chemists, however, should find special interest in the visits to two plants—at Harrow and Fulham—of the Gas Light & Coke Company, where some of the company's work on research and development in gas purification was shown.

The Harrow Plant

At Harrow, where the whole of the gas made is treated for the decomposition of organic sulphur, the four reaction vessels (Fig. 1) each hold 15 cu. ft. of nickel subsulphide catalyst on china clay pellets. Gas of about 560 C.V. from horizontal retorts, purified and washed for naphthalene removal, enters the heat exchanger from the rising main and after travelling axially over the outer surface of the tube bundle, leaves through the lower hot main. It is then distributed between the catalyst vessels and passes by the upper main to the tubes of the heat exchanger and thence to the scrubber cooler.

The heat exchanger is a two-pass unit, each half containing 178 steel tubes 12 ft. long, of 1.25 in. external, and 1.09 in. internal diameter, arranged on 1.56 in. triangular pitch in a cylindrical shell 35.25 in. in diameter. Allowance for expansion and movement is provided by a floating head construction of one tube plate, and the shell is roller mounted. Short-circuiting of inlet gas along the annular space between the shell and the tube bundle is prevented by baffles. The gas takes about 1 sec. to travel through this unit.

The catalyst vessels are 4 ft. 6 in. high and 3 ft. in diameter. The catalyst rests on 45° conical grids of nichrome mesh and the charge can be withdrawn through a vertical 2-in. pipe extending through the inlet gas connection. Charging points are provided in the top covers which are removable if necessary. Each vessel can be isolated from the gas stream; movement is allowed by the sling suspension in which each is carried. The gas takes about 1 sec. to pass through the catalyst bed.

The washer-cooler is a cast-iron tower 3 ft. in diameter and 30 ft. high, packed with wooden boards on edge to a depth of 18 ft. 2 in. The pump draws liquor from a cast-iron storage tank and delivers it through a rack cooler to the top of the tower at a temperature below 25°C. The liquor leaving the tower passes through a seal pot back to the storage tank. An electrically driven

centrifugal pump is normally operated; a steam-driven turbo set is installed as a stand-by.

The air burner is fitted in the end cover of the hot main; by use of this device, air

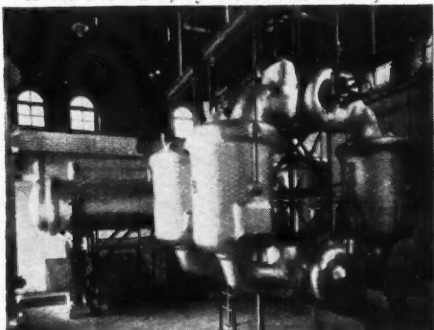


Fig. 1. The Harrow catalytic plant, showing the four reaction vessels and (left) the heat exchanger.

is burned in the coal gas stream under conditions which give a non-luminous flame. This installation is necessary in order to start the whole plant from cold, but it is not in operation when once the working temperature has been reached, as all the heat requirements are then provided from the reaction between hydrogen and oxygen on the catalyst and by heat exchange between ingoing and outgoing gas. Base-metal thermocouples in steel pockets register temperatures on a single instrument.

Normal Working Conditions

It is usual to operate the plant at a space velocity of 1000-1200 volumes per hour, the ingoing gas being preheated to 220° C. The maximum catalyst temperature is 365° C. and the treated gas enters and leaves the heat exchanger at 360° C. and 140° C. respectively. The oxygen consumption is about 1.2 per cent.

The washer-cooler reduces the gas temperature to about 25° C. and removes oxides of sulphur, and water formed by the oxygen-hydrogen reaction. The liquor rate is 30 gallons per 1000 cu. ft. of gas and 800 gallons are in circulation. Once per shift about 320 gallons of this is run to waste and replaced by 300 gallons of fresh 2 per cent. soda ash solution. The catalytic purification process reduces the nitric oxide content of the gas to about 0.1 part per million, and sulphur in the outlet gas, other than thio-

phen, is reduced to a concentration between $1\frac{1}{2}$ and $4\frac{1}{2}$ grains per 100 cu. ft. depending on the sulphur in the original gas and other circumstances. Thiophen is not decomposed by the nickel subsulphide catalyst, but is almost completely removed by the active carbon plant.

Although nearly the whole of the converted sulphur is recovered as sulphur dioxide, and therefore is removed in the washer-cooler, a small proportion appears as hydrogen sulphide owing to the partial hydrogenation of some sulphur dioxide in the hottest part of the catalyst bed. This hydrogen sulphide is removed by means of iron oxide, either in a catch-box of conventional design or in a special unit containing pellets of iron oxide. The latter has a capacity of 234 cu. ft. and contains $4\frac{1}{2}$ tons of material.

The catalyst gradually becomes fouled during use and after about three months needs regeneration. This is effected by combustion of the carbonaceous fouling material at the lowest possible temperature. The fouled catalyst is charged into a brick-lined vessel and the top surface raised to 500-550° C. by radiation from an electric heater attached to the underside of the top cover. Air is then passed downwards through the charge at the minimum rate which will maintain combustion. A narrow reaction zone travels through the bed, taking three or four days to reach the bottom. The fouling material is completely removed, the nickel subsulphide becoming oxidised to the basic sulphate. The production of dust is negligible. Regenerated catalyst is activated by placing it on top of a bed which is already at work; the sulphate is rapidly reconverted to the active subsulphide by reaction with hydrogen.

Studies on Thiophen

The nickel subsulphide catalyst, as already stated, does not decompose thiophen, although the other sulphur compounds are destroyed. While treatment in a benzol plant can remove the bulk of the thiophen, it would be advantageous to find a catalyst which would cause it to react. With this objective, work at Fulham is concerned with a study of the behaviour of thiophen. Measurements are being carried out by absorption on catalysts, by investigation of the kinetics of reactions involving thiophen, and by a fundamental study of the structure of a series of catalysts. Experiments have been based on the circumstance that while thiophen is relatively easily hydrogenated by several catalysts in the presence of pure hydrogen, it is completely unaffected, with the same catalysts, when coal gas is present.

Another factor which must be considered in the full-scale application of the catalytic process, is that the catalyst is known to be effective in at least sixteen different reactions. These involve hydrogen, oxygen,

water, hydrogen sulphide, sulphur dioxide, carbon disulphide, carbon oxysulphide, mercaptans, nitric oxide, hydrocyanic acid, olefines and diolefine hydrocarbons. Without detailed knowledge of the velocities and kinetics of all the possible reactions, it is not possible to predict accurately what course will be followed under any given set of conditions where such a variety of reactants is competing for the available surface of the catalyst.

Apart from these small-scale experiments, work is in progress on design of full-size plant for catalytic removal. A new type of catalyst vessel has been developed in which the gas flows horizontally through a number of compartments; the catalyst in these can be handled separately and may be altered in composition if desired.

Hydrogen Sulphide Removal

The long-established method of purification of gas by means of iron oxide has been newly investigated with two objectives; firstly, to determine which of the different molecular forms of iron oxide is most suitable, and secondly, to attempt to improve the speed of the reaction with a consequent reduction in the size of plant.

Taking the seven forms of ferric oxide, the rate of reaction of the individual forms with H_2S has been measured, as well as the rate of oxidation of the sulphides produced; characteristic curves were obtained from these experiments. This work has shown that $\alpha\text{-Fe}_2\text{O}_3\cdot\text{H}_2\text{O}$ is the best form of ferric oxide for removal of hydrogen sulphide; $\gamma\text{-Fe}_2\text{O}_3\cdot\text{H}_2\text{O}$ is nearly as reactive but is not easy to prepare on a large scale. The other three hydrated forms, and both anhydrous ferric oxides, are far less suitable.

When the iron sulphide is oxidised, it will reform $\alpha\text{-Fe}_2\text{O}_3\cdot\text{H}_2\text{O}$ provided that certain precautions are observed. The most important of these are (1) that the system should not become acid, (2) that the temperature should not rise too high. Under acid conditions, the hydrated Fe_2S_3 decomposes to FeS_2 and Fe_2S_3 ; these two sulphides are relatively very stable to oxidation and do not revert to $\alpha\text{-Fe}_2\text{O}_3\cdot\text{H}_2\text{O}$, so that the purifying cycle is broken. Oxidation at too high a temperature leads to the formation of iron sulphate, instead of oxide, and the material is thus rendered useless for further purification.

Further work was now needed to develop a method for preparing this oxide in a highly reactive form. Two methods have finally been adopted for this purpose; one of these depends on the use of calcium sulphate as a binding agent to hold together $\alpha\text{-Fe}_2\text{O}_3\cdot\text{H}_2\text{O}$ into small pellets, the other uses high pressure only to form tablets.

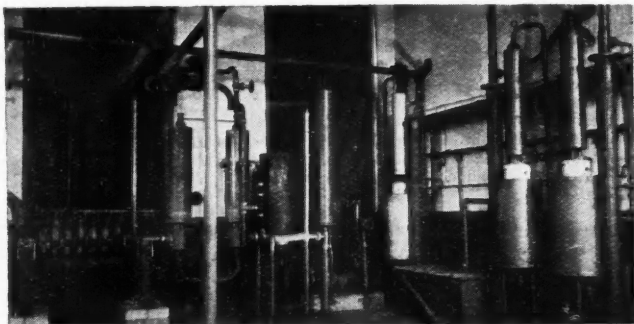
Two test towers have been installed at the Fulham works for the development of purification by means of shaped iron oxide. These are each 2 ft. in diameter and con-

tain oxide to a depth of $8\frac{1}{2}$ ft. Oxide can be withdrawn from the base and added to the top of the towers, counter-current to the gas flow.

About one ton of oxide pellets, occupying 53 cu. ft., was prepared by mixing powdered

air and which contained 17 per cent. moisture and 10 per cent. sulphur. The gas rate was again 4000 cu. ft. per hour and oxide pellets were moved as before. No unused oxide was employed, all additions being from the once-run material. Gas to

Fig. 2. Semi-scale units at Fulham for catalytic experiments. On the left is the sectional catalyst vessel for use with horizontal gas flow.



commercial ferrous sulphate hydrate ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$) with one-third of its weight of slaked lime, and rolling the mixture in a drum while a fine spray of water was admitted. The ensuing reaction produced $\alpha\text{-Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$ and CaSO_4 ; the latter functioned as plaster of Paris and, on setting, held the granules together. The product was graded to stay on $3/16$ in. and to pass through $\frac{3}{8}$ in. sieves. The material as packed into the towers contained about 14 per cent. of water and had a pH of 8.0.

Coal gas was passed through the towers in series at 4000 cu. ft. per hour, and removal of H_2S was for a time complete. Not until 380,000 cu. ft. had been treated did the outlet concentration of H_2S reach one part per million. The oxide pellets were then moved counter-current to the gas stream by adding fresh material to the top of the second tower, and material discharged from the bottom of this to the top of the first tower, while the oxide from the bottom of the first tower was rejected. The rate of travel of the pellets was adjusted so as to give satisfactory purification of the gas. During this process, 800,000 cu. ft. of gas were treated and 25.3 cu. ft. of oxide were rejected; the inlet H_2S averaged 335 grains per 100 cu. ft. and the outlet 0.6 parts per million. The material withdrawn contained about 20 per cent. sulphur, its moisture content remaining unchanged. This agrees well with the calculated figure of 21.6 per cent. It is clear that even lower outlet concentration of H_2S could be obtained by using a deeper bed of material, or by increasing the rate of withdrawal.

A later test was made with carburetted water gas, using pellets from a coal-gas run which had been revived by exposure to

the amount of 660,000 cu. ft. was treated, and 16.2 cu. ft. of oxide rejected; the inlet H_2S was 165 grains per 100 cu. ft., the outlet 0.4 parts per million. There was 22.3 per cent. sulphur and 15.2 per cent. moisture in the pellets discharged. In standard oxide-box practice, the treatment of 4000 cu. ft. of gas per hour would require 4 boxes, each of 48 sq. ft. cross-section and with an effective depth of 16 ft.; the oxide volume would therefore be 768 cu. ft. or 14 times that used in the towers.

The sulphur content of the discharged material is lower than is customary in oxide purification, and it is doubtful whether a figure above 30 per cent. could be reached by successive foulings, but the material lends itself admirably to extraction of the sulphur by means of solvents.

The plant has now been adapted to the investigation of the performance of iron oxide nodules for the removal of small concentrations of hydrogen sulphide, such as are found, for example, at the outlet of the Harrow catalytic plant. Purified gas from the outlet of the works purifiers passes through one of the towers filled with nodules as a safety precaution, and then through a non-return valve, after which it is joined by a small stream of crude gas, and passes to a small gas booster. By control of each gas stream, the concentration of hydrogen sulphide in the gas leaving the booster can be adjusted, a suitable value for test purposes being 5 grains per 100 cu. ft. The gas is then delivered through a steam heater into the base of the other tower, which is filled with the material under test. The gas flows upwards while the material is passed down the tower at the necessary rate to achieve satisfactory purification.

Empire Scientific Conference

Royal Inauguration

LAST Monday forenoon, in the Senate House of the University of London, the Empire Scientific Conference, convened and organised by the Royal Society, was opened by His Majesty, King George VI, as Patron of the Royal Society. The assembly of the delegates and their guests was enlivened by the strains of a band of the Royal Artillery, and the royal party, in which the King was accompanied by the Queen, Princess Alice, and the Earl of Athlone (Chancellor of the University of London) arrived at precisely 11 a.m.

The President's Address

Sir Robert Robinson, President of the Royal Society, expressed their gratitude to His Majesty for his consent to open this first Empire Scientific Conference. Recording the Society's long-standing indebtedness to royal patronage, he sketched a few of the events in its history which had brought it into ever closer connection with the overseas portions of the royal domain. The decision to convene the present conference had arisen from the fact that during the late war the Society had been a focal point for the discussion of scientific matters of mutual interest to scientific officers of the Dominions, and with a view to facilitating the future exchange of views on matters of common concern.

During the conference, problems of agricultural and medical science will be discussed in relation to the varying conditions obtaining in the Empire; likewise land utilisation, the survey of mineral resources, and the industries that can arise from the development and proper use of the Empire's bountiful material products.

It is the Society's ambition, the president said, to make the Empire "an example to the world of what may be achieved by friendly intellectual intercourse, the clash of one mind on another, and by mutual criticism and encouragement." Great importance is being attached not only to the more formal morning sessions, but also to the evening sessions with their informal exchange of ideas, which alone can ensure the full success of the conference. From his personal experience of international gatherings, the president said, it has often been the unrecorded proceedings that proved the most significant.

The Royal Society's Conference will be followed by one of the scientific representatives of the Governments of the Dominions and of India; and by the Society's own celebration of the tercentenary of the birth of Newton, in the week beginning July 15. The actual date of Isaac Newton's birth was

Christmas Day, 1642, but a commemoration in 1942 was impossible. Delegates from foreign academies have been invited to this celebration.

The King's Speech

In declaring the conference open, the King expressed his great pleasure at performing this ceremony, and in greeting the delegates. He hoped that this first conference was destined to be the beginning of an era of closer scientific contact within the Empire. He stressed the special value of the directness of appeal of the spoken word—however skilled the writings of the delegates might be; and he looked forward to future meetings in other capital cities of the Empire. Although for six years we had concentrated our scientific energies mainly on destroying the power of our enemies, yet great constructive advances had also been made, for example, the discovery of penicillin, of new insecticides, of methods of production for new organic chemicals and synthetic drugs. He did not consider that the enormous potentialities, for good or evil, of the release of atomic energy was an argument against scientific research; it should, however, increase our respect for moral principle, as it had increased our awareness of the power of scientific method. The wastage of six years of war had to be made good, and scientific research must be employed in reconstruction. The Empire is a laboratory richly stored with material, which can be developed by co-operation in unity.

His Majesty concluded with the fervent wish that God would prosper their deliberations.

Dr. C. J. Mackenzie, as leader of the delegation from the senior Dominion, expressed the general feeling of gratitude to Their Majesties for appearing personally to open the conference. They who had come from distant lands had, in their devotion to the Crown, an essential and unbreakable tie that bound them together, united and indivisible. Speaking personally as a Canadian, he placed on record his nation's vivid appreciation of the visit of the King and Queen to Canada before the war; and he thanked the president and the Royal Society for the arrangements which had made it possible for them to gather in conference. He suggested that the conference itself, to which many of them had come long distances, and at the sacrifice of time they could ill afford, was the best evidence of their quiet determination to arrive at some workable scheme of liaison that would be of value to the Empire, and also, he hoped, would serve as an example for a wider and probably

more important international scheme. They would all, he was sure, most reverently join His Majesty in the prayer that God would prosper their deliberations.

Chemical Delegates

The delegates were then presented to their Majesties. Included among them, besides the officials of the Royal Society, were many distinguished chemists, as well as representatives of every branch of science. Among the United Kingdom delegates were: Professor A. C. Chibnall, F.R.S., Professor of Biochemistry, University of Cambridge; Sir Henry Dale, F.R.S., Director of the Davy-Faraday Research Laboratory and Professor of Chemistry, Royal Institution; Professor W. N. Haworth, F.R.S., Professor of Chemistry, University of Birmingham; Sir Ian Heilbron, F.R.S., Professor of Organic Chemistry, Imperial College of Science and Technology, London; Professor C. N. Hinshelwood, F.R.S., Professor of Chemistry, University of Oxford; and Dr. J. L. Simonsen, F.R.S., Director of Research of the Colonial Products Research Council. From the Australian delegation: Sir David Rivett, F.R.S., Chairman, C.S.I.R.; Professor E. J. Hartung, Professor of Chemistry, University of Melbourne; and Mr. H. R. Marston, Chief, Division of Biochemistry and General Nutrition, C.S.I.R. From the Canadian delegation (besides Dr. C. J. Mackenzie, President, National Research

Council, and Director-General of Research and Development, Department of Reconstruction): Professor A. T. Cameron, Professor of Biochemistry, University of Manitoba, Chairman, Fisheries Research Board; Professor P. E. Gagnon, Professor of Chemistry, Laval University; Professor Leon Lortie, Professor of Inorganic Chemistry, University of Montreal; and Professor O. Maass, F.R.S., Professor of Physical Chemistry, McGill University, Director of Chemical Warfare and Smoke, Department of National Defence, and Director, Canadian Pulp and Paper Research Institute. From the Indian delegation: Professor H. J. Bhabha, F.R.S., Director, Tata Institute of Fundamental Research, Bombay; Sir Shanti S. Bhatnagar, F.R.S., Director, Scientific and Industrial Research, New Delhi; Sir Jnan Ghosh, Director, Indian Institute of Science, Bangalore; Professor M. R. Siddiqui, Director, Research Institute, Osmania University, Hyderabad (Deccan); and Colonel Sir Sahib Sokhey, Director, Haffkine Institute, Bombay. From New Zealand: Dr. E. Marsden, F.R.S., Secretary of the Department of Scientific and Industrial Research; and Professor F. G. Soper, President, New Zealand Institute of Chemistry. From South Africa: Dr. B. F. J. Schonland, F.R.S., President of the Council for Scientific and Industrial Research. Also representatives from Eire, Southern Rhodesia, Ceylon, East and West Africa, Hong Kong, Palestine, and the West Indies.

Fibrous Proteins

Notable Contributions to Leeds Symposium

AMONG the papers read at the Symposium on fibrous proteins, held by the Society of Dyers and Colourists, at Leeds University on May 23, were notable contributions by Dr. Dorothy Jordan Lloyd, M.A., D.Sc., F.R.I.C., director of research, British Leather Manufacturers' Research Association, London; Dr. H. Eilers and Mr. J. A. Labout, of the Algemeene Technische Afdeling, Holland; Dr. C. S. Whewell, Ph.D., A.R.I.C., F.T.I., Mr. H. J. Woods, M.A., F.Inst.P., and Mr. J. L. Stoves, Ph.D., of Leeds University.

The symposium was opened by the Vice-Chancellor of Leeds University, Mr. B. Mout Jones, D.S.O., M.A., and an address followed by the President of the Society, Mr. C. M. Whittaker, B.Sc. Of an international character, it was of outstanding importance in the dyeing, colouring and textile worlds, and to all interested in the chemistry, physics and manipulation of fibrous proteins, whether natural or synthetic.

Dr. Jordan Lloyd, in her paper on "The

Rubber-like Condition of the Fibres of Animal Skin," stated that the effect of temperature on the load-extension curves of (1) elastin in water, (2) silk after axial contraction in formic acid, (3) collagen after axial contraction in formic acid, and (4) keratin (horse-hair) in formic acid, all suggested that the "rubberiness" of protein fibres (when in the rubber-like condition) depended partly on entropy effects in the configuration of the polymeric backbone.

"When the ratio of polar groups in the side-chains per unit length of backbone is low, this entropy effect is marked," she continued. With increasing ratio of side-chain polar groups, however, the entropy effect diminished, and finally could not be demonstrated. The rubberiness of protein fibres in the absence of entropy effects was ascribed to mutual attractions of the polar side-chains.

"Elastin forms a fibre in which rubberiness is almost entirely due to entropy effects in the backbone," she added. "Keratin forms one in which rubberiness is mainly due to the mutual attraction of polar side-

chains." Silk and collagen appeared to be intermediate. A protein fibre could not show rubbery properties unless the polymeric backbone was in a condition of irregular (elastin) or regular (keratin) looping, i.e., with a lesser overall length per molecule than at full extension.

"Non-solvent" Water in Hides

Dr. Eilers read a paper on the "non-solvent" water in hides, which formed part of a comprehensive investigation into the behaviour towards water of hides in leather manufacture.

It was carried out during the occupation of the Netherlands in the Laboratory of N.V. De Bataafsche Petroleum Maatschappij (subsidiary of the Royal Dutch Shell Group), at Amsterdam, as suggested by the "Organisation for Applied Scientific Research" (S.N.O.) in Holland.

Distinguishing generally between "free" and "bound" water in a colloidal system (e.g., a gelatin gel or vegetable or animal tissue) when dehydrated, Dr. Eilers mentioned that one of their aims was to discover the condition in which the water that was most difficult to remove was present in the material.

He stated that it might be concluded that the percentage of non-solvent water in hides was not much affected by the various operations preparatory to tanning; during the latter process, however, changes were observed. With chrome tanning the percentage of "water not dissolving saccharose," calculated on hide substance, increased, whereas with vegetable tanning it decreased.

The increase found in the former process might be explained by assuming that the chrome complex itself absorbed considerable quantities of non-solvent water. The decrease in the case of vegetable tanning might be caused by replacement of non-solvent water by tanning material. To what extent the vegetable tanning materials were hydrated was not known.

Dr. C. S. Whewell's and Mr. H. J. Woods' subject was the super-contraction of animal fibres. In it the physico-chemical methods of producing super-contraction in keratin were reviewed and discussed in connection with the use of the phenomena as a test for side-chain modification.

Besides the more familiar types of super-contraction induced by steaming relaxed fibres or by boiling in various reagents, a reversible super-contraction phenomenon was discussed, together with its relaxation to the general theory of main-chain folding following side-chain breakdown.

"The decay of tension which takes place when a fibre is held stretched in the presence of hot or cold water or dilute aqueous caustic soda solution is ascribed largely to side-chain breakdown," it was

stated. Since it might be taken as axiomatic that the equilibrium configuration of a molecular grid depended on the state of the side-chain linkings (not necessarily excluding effects due to van der Waals forces or hydrogen bond interaction in the backbone direction) it might be supposed that side-chain breakdown, if sufficiently pronounced, would leave the main chains in a more labile condition, in which other equilibrium configurations than the normal α -form were possible. In particular, the chains might be able to fold into shorter lengths than in the α -form, and thus leave the fibre as a whole in a contracted condition. This was the basic idea underlying the phenomenon of supercontraction following relaxation.

Mr. J. L. Stoves, in the course of his paper on "The Chemistry of Animal Hair," said that chemically hair and other epidermal structures such as animals' nails, hoofs and horns, porcupine quills, and the feathers of birds, belonged to the keratin group of scleroproteins. X-ray analysis and physico-chemical studies showed that the more highly organised parts of keratin fibres were composed of incompletely extending polypeptide linkages to form sheets or grids.

Bundles of such sheets were held together by van der Waals forces, and hydrogen bonding between carbonyl and imino groups of adjacent sheets. There was no clear demarcation between crystalline and amorphous phases, but rather was there a continuous graduation of organisation.

President's Comments

The president of the Society, Mr. C. M. Whittaker, in his address, recalled that the symposium on fibrous proteins was the second promoted by the Society, and said that if the war had not intervened there would have been one held in 1939, on cellulosic fibres. "This symposium marks the first stage in the resumption and extension of the society's activities," he asserted. The subject, "Fibrous Proteins," was an example of the increasing research applied in textiles, and he asked all present to think for a moment of the number of patents on the anti-shrink treatment of wool. "In my opinion it takes the dyeing and finishing industry all its time to refute the charge of being very dull," he declared, and gave the example of the Metachrome Mordant and Metachrome Brown B, which were introduced in 1901, when he was very young in the industry, yet the dye-makers were now active in research to develop dyestuffs particularly suitable for this process—a mere 40 years afterwards!

The foreign trade office of the Chinese National Resources Commission in Shanghai has arranged to publish weekly quotations for antimony and tungsten.

Patents and Income Tax

Explanatory Notes by the Board of Inland Revenue

THE Board of Inland Revenue has recently issued notes* on Patents and Income Tax which explain the main features of the law and practice in operation with effect from April 6, 1946, and do not, in general, apply to years of assessment before 1946-7. They have no binding force and do not affect a taxpayer's rights of appeal to General or Special Commissioners or from them to the Courts. The notes deal with (a) allowances in respect of expenditure on patent rights; (b) the taxation of sums received in respect of such rights.

Definitions

Before going into details, it is advisable to bear in mind the definitions of terms used in the notes (para. 16, at the end of the pamphlet):

"*Capital expenditure*" and "*Capital sum*" do not include sums treated as revenue-expenditure or receipts for income tax purpose or sums such as royalties from which the payer is entitled to deduct tax (except payments to non-residents, *see* Note 11 below).—[Sect. 64, Income Tax Act, 1945.]

"*Sale*" includes the grant of licence to the exclusion of the grantor and all other persons for the rest of the term of the patent.—[Sect. 43(2), Income Tax Act, 1945.]

"*Licence*" includes use of an Invention by the Crown under Sect. 29, Patents and Designs Acts, 1907 to 1942, or by the Government of another country.

"*Patent Income*" includes both the capital sums chargeable to tax as per Sect. B below, and royalties, etc., payable in respect of user.—[Sect. 43(1), Income Tax Act, 1945.]

1. Under the law in force before April 6, 1946, "royalties or other sums paid in respect of the user of a patent," in the past or future, restricted as to amount or quantity, without any transfer of a property in the patent, were treated as income, to be taxed by the recipient, and constituting items of deduction for the payer. This remains substantially unchanged but for the introduction of certain reliefs to be discussed below.

Sale (as defined above) was treated as capital and, except in the case of a trader in patents, no income tax allowance was made to the payer. This will be reversed, with certain exceptions, for payments made after April 5, 1946, which will be taxed as income of the recipient.

SECTION A: ALLOWANCES FOR CAPITAL EXPENDITURE ON PURCHASE OF PATENT RIGHTS (Sect. 35 and 36, Income Tax Act, 1945).

2. *Expenditure qualifying for allowances* includes capital expenditure incurred after April 5, 1946, for "Sale," provided the contract was not effective before that date. This does not include payments from which income tax is deductible, such as royalties or payments treated as business expenses of a dealer in patents (Sect. 64, Income Tax Act, 1945).

3. *Persons entitled to allowances* are (a) a trader liable to U.K. income tax on his trade profits, in respect of patent rights acquired for that trade; (b) a resident of the U.K. in respect of any patent rights; (c) a non-resident in respect of U.K. patent rights only.

4. *Allowances are granted to traders* by deduction from assessment on trade profits. Balances in favour of the trader will be carried forward as deductions to the subsequent year or years without time limit. Spaces are provided for claiming allowance in the annual income tax return forms. Traders who failed to complete these spaces should inform the Inspector of Taxes without delay. Non-traders are granted allowances by discharge or repayment of tax on patent income (*see* Note 16 below). Any balance can be carried forward, as above.

Annual Allowance Conditions

5. *Annual Allowances.* Capital expenditure on the purchase of patent rights is spread in general, by equal annual instalments, over 17 years, or where the remaining term is shorter, over that shorter period. The allowances begin in the year of assessment in which the expenditure was incurred except for a trader, when they begin in the year the assessment for which is based on the period of the accounting period in which the expenditure was incurred.

6. (i) *Effect of lapse or sale of whole of the patent rights.* No further annual allowances are made after sale of patent rights but adjustment is reached by a balancing allowance or charge which secures equality between total allowances received and net expenditure made on the patent rights, i.e., amount originally paid for them less amount for which they are sold. If a person sells patent rights for more than they cost him, the balance charge will be equal to the aggregate of the allowances previously granted, and, on the surplus, tax will have to be paid under Section B below for capital gain, or by the trader on his trade profit. If a patent is allowed to lapse, the balancing allowance will be the amount of expenditure

* H.M. Stationery Office No. 490.

not already allowed, i.e., original expenditure less annual allowances for previous years.

(ii) *Sale of part of the patent rights*, such as by granting an exclusive licence for part of the territory covered by the patent in return for a capital sum. Here Note 6 (i) applies with the following modifications:

(a) No balancing allowance, if proceeds of sale are less than unallowed amount of original expenditure; annual allowance continues for the part retained by seller, but will be computed by reference to unallowed part of original expenditure less proceeds of sale and to the remaining period of seller's rights. (b) No further annual allowances where proceeds exceed unallowed amount of original expenditure. Balancing charge corresponding to that under 6 (i) above. (c) On subsequent sale or lapsing of the remainder of rights, the proceeds of the previous part-sale will reduce unallowed amount of original expenditure and balancing allowance or charge will be made accordingly.

Tax on Capital Gains

Section B: TAXATION OF CAPITAL SUMS RECEIVED FOR SALE OF PATENT RIGHTS (Sect. 37, Income Tax Act, 1945).

7. *Sums liable to tax are capital sums received for a sale after April 5, 1946*, but only where sale was not effected before April 6, 1946. Payment of a lump sum by the Crown, e.g., for future unlimited user, will be treated as sale for a capital sum (Sect. 43 (3) Income Tax Act, 1945). The charge applies (i) to the sale of any patent by a resident of the U.K. (see Notes 8 to 10), and (ii) to the sale of U.K. patent rights by a non-resident (see Note 11).

Not included are royalties, etc., payments from which income tax is deductible or payments treated as trade receipts of a person assessed to tax on profits of dealing in patents (Sect. 64, Income Tax Act, 1945).

8. *Deduction of cost of acquisition* by residents in the U.K. Where the seller himself acquired the patent rights by purchase he is liable to tax on any capital gain he makes, i.e., on the excess of what he receives over what he paid. If there are successive sales of parts of the patent rights he will be charged tax on the net capital gain he makes from the whole.

9. *Tax to be spread over six years*. Normally one-sixth of the sum liable to tax will be assessed for the year of assessment and for each of the succeeding five years, unless the seller himself requests the Inspector of Taxes within 12 months of the end of that year to charge upon the whole sum for the year in which it is received.

10. *Death, etc., of seller during the spreading period* (Second Schedule, Income Tax Act, 1945). In the case of death of an individual, or of the winding-up of a company, or a partnership, the amount not yet

assessed will not be assessed in instalments, but will be charged as a whole, unless the personal representatives of the deceased, or the individual members of a dissolved partnership, claim the continuation of such instalments within 21 days after the service of notice of assessment of the unassessed balance.

11. *Persons not resident in the U.K.* A resident in the U.K. buying patent rights from a non-resident is required to deduct tax from the purchase price at the standard rate for the year of the payment, and to pay the tax to the Inland Revenue. The non-resident may claim refund (a) on account of his costs for acquiring the rights, (b) on the basis of spreading the capital sum over six years, the latter claim to be made within twelve months after the end of the year of assessment in which the sum is paid; repayment will be made in yearly instalments.

SECTION C: MISCELLANEOUS RELIEF FOR EXPENSES (Section 39, Income Tax Act, 1945).

12. (i) *Expenses incurred in devising patented inventions* can be claimed if relief is not already given under some other provision of the Income Tax Act. If expenditure is incurred after April 5, 1946, it will be allowed in full; if before April 6, 1946, there will be left out of account as many seventeenths of the expenditure as there are complete years between the commencement of the patent and April 6, 1946, and only the balance will be allowable. Where the inventor is carrying on a trade, and the patent is used for that trade, allowance will be granted as a deduction on profits, otherwise it will be set-off against patent income as per Note 4.

Deductable Fees

(ii) *Patent Office fees, agent's charges, etc.* A trader will be allowed to deduct his expenses for obtaining and sealing a patent or getting its term extended after April 5, 1946. Renewal fees and charges will continue to be deductible. A non-trader will have relief set-off against patent income (see Note 4).

13. *Spreading of royalty payments, etc.* Income Tax is usually deducted from royalties and other payments in respect of the user of a patent, including sums received for past user of a patent by the Crown under Sect. 29 of the Patents and Designs Act. Where for 1945/6 or any subsequent year of assessment the patentee received such payment covering past user for six years or more, he may apply to the inspector of Taxes to have his liability (including surtax) adjusted to what it would have been if the payments had been spread in equal instalments of the six years ending with that in which the payment is received. If the

(Continued on p. 708)

Personal Notes

DR. ROGER ADAMS, of Illinois University, has been awarded the Theodore William Richards Medal for conspicuous achievement in organic chemistry.

MR. W. G. ADAM, who has retired after 31 years as superintendent of the product works of the Gas, Light and Coke Co., Ltd., was awarded the George Medal for brave conduct during the "blitz" on London in 1940.

SIR WILLIAM PALMER, former principal industrial adviser to the Board of Trade, has been appointed chairman of the Central Rayon Office, Ltd. His appointment as chairman of the British Rayon Federation was announced last April.

MR. J. W. BEYEN, who has been appointed director of the International Bank of Reconstruction and Development in Washington, is, in consequence, resigning from the Boards of Lever Brothers & Unilever (N.V.) and Lever Brothers & Unilever, Ltd., as from June 30.

MR. A. DYSON, M.Inst.C.E., joint managing director of Horseley Bridge and Thomas Piggott, Ltd., has been elected president of the Institute of Welding, and Mr. J. L. ADAM, C.B.E., M.I.N.A., chief surveyor, British Corporation Register of Shipping and Aircraft, vice-president for the year 1946/47.

MR. JOHN BENN, a director of Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, who is visiting the United States, attended a few days ago the National Press Club luncheon to the new British Ambassador in Washington, Lord Inverchapel's first public speaking engagement following the presentation of his credentials to President Truman.

DR. J. C. SPEAKMAN, formerly Lecturer in Chemistry at Sheffield University, has now taken up his duties as Lecturer in Chemistry at Glasgow University. Mr. F. D. GUNSTONE, of Liverpool University, and Mr. R. J. REED, of University College, London, have been appointed to junior Lectureships in Chemistry at Glasgow from the beginning of next session.

MR. W. C. SHELDRAKE, a senior member of the engineering staff of the I.C.I. Gaskell-Marsh works, Widnes, retired last week after 24 years' service with I.C.I. and allied companies, having joined the United Alkali Co. in 1922. His retirement was marked by a convivial entertainment and by the presentation of a radio set, an illuminated manuscript, and a writing case, from members of the staffs of the Gaskell-Marsh and Wigg works.

The directors of the Swedish Wood Research Institute, Stockholm, which has re-

cently been enlarged and reorganised, have appointed MR. OTTO BRAUNS as chief engineer and superintendent of the Institute, and DR. BORJE STEENBERG as head of the paper technology department. Mr. Brauns has had wide experience in chemical engineering, not only in Sweden but also in Canada, with the Abitibi Power & Paper Co., and in the U.S.A., with the Algonquin Paper Corporation. In 1932 he won the Weldon Medal of the Canadian Pulp and Paper Association. Dr. Steenberg has worked more on the theoretical side, and has published works on crystallography, metallography, and analytical chemistry. In 1944-46 he was assistant professor of theoretical chemistry at the Royal Technical College, Stockholm. He has also worked in the State pharmaceutical laboratory, and was awarded his degree of "docent" for a paper on "The Adsorption and Exchange of Ions on Activated Charcoal."

Obituary

MR. THURSTAN WILLIAM FAIRHURST, whose sudden death on June 15 has been reported from Milwaukee, Wisconsin, U.S.A., was a director of Ruston & Hornsby, Ltd., Lincoln, and of Davey Paxman & Co., Ltd., Colchester.

Birthday Honours

Chemical and allied sciences are well represented in the Birthday Honours list, published last week.

Among those knighted are MR. WILLIAM THOMAS GRIFFITHS, chairman and managing director of the Mond Nickel Company; MR. HARRY JEPHCOTT, honorary Manufactured Foods Adviser to the Minister of Food; MR. ALEXANDER LOWE MCCOLL, chairman, Lubricating Oil Committee, Petroleum Board; and MR. HAROLD LEONARD SAUNDERS, Comptroller-General of the Patent Office. The following have been created K.B.E.: MR. JOHN CLAUD FORTESCUE FRYER, O.B.E., secretary, Agricultural Research Council; PROFESSOR JOHN EDWARD LENNARD-JONES, F.R.S., Director-General of Scientific Research (Defence), Ministry of Supply.

The following are appointed C.B.E.: MR. WILLIAM AETHELBERT DAMON, F.R.I.C., chief inspector of Alkali Works, Ministry of Health; PROFESSOR WILLIAM EDWARD GARNER, F.R.S., lately chief superintendent, Armament Research Department, Ministry of Supply; PROFESSOR REGINALD PATRICK LINSTED, F.R.S., employed in a department of the Foreign Office; DR. ALBERT PARKER, F.R.I.C., Director of Fuel Research, D.S.I.R.; DR. HERBERT SCHOFIELD, M.B.E., Principal, Loughborough College; MR. RICHARD NOEL GARROD-THOMAS, Sulphuric Acid Controller, Board of Trade; MR. JAMES PHILIP VAN DEN BERGH, Director of Margarine and of Dehydration, Ministry of Food; MR. CHARLES

REGINALD WHEELER, lately Controller of Iron and Steel, Ministry of Supply.

The O.B.E. has been awarded to Mr. RICHARD CHARLES ARBERY, M.B.E., Indian Ordnance Services, Controller of Inspection, Metallurgical; and DR. HEM SINGH PRUTHI, Plant Protection Adviser to the Government of India, and Director, Locust Control, India.

Parliamentary Topics

Copper Wire Bars

IN the House of Commons last week, Mr. Renton asked the Minister of Supply what his Department was paying for copper wire bars and the conversion margin, into hot rolled copper wire rods from Canada; and whether bought f.o.b. or c.i.f.

Mr. Leonard: The price paid for Canadian copper wire bars and the margin for Canadian copper rods are part of the contractual arrangements between the Ministry of Supply and the Canadian companies concerned and it would be contrary to established practice to give details of the prices paid in such cases.

Patents and Income Tax

(Continued from p. 706)

period of user is between two and six years, similar adjustment can be claimed by spreading over the number of complete years of user.

14. *Patent income treated as earned income* (Sect. 40, Income Tax Act, 1945). The inventor, if owning the entire patent, or a part of it, for 1946/7 and later years, will enjoy the relief granted for earned income.

15. *Special treatment of certain sales* (Sect. 59, Income Tax Act, 1945). In the case of sales between parties that are under common control as defined in the Act and of sales between other persons where the main object of the transaction appears to have been the obtaining of an income-tax allowance, the market value of the rights sold may be substituted for the actual sale price; in that event, the allowances to both parties and the amount of any charge under Section B will be governed by the substituted figure. If the case is one of common control only, the parties may elect, subject to conditions, to have the sale treated as taking place at a figure equal to the unallowed expenditure on the patent rights. If patent rights are sold together with other assets, the total price paid for the whole of the property is apportioned to the various assets. Paper prices attached to particular assets, or prices attached to assets purporting to be sold separately, will not be regarded as conclusive.

The British Association

An Appeal for Members

DURING the war years the British Association for the Advancement of Science held a number of conferences on the social and international relations of science. Audiences were admitted irrespective of membership and those who found interest and benefit from the Association's work are now being invited to support the Association by becoming members or associates, a large number of both having inevitably been lost during the war.

The annual meeting this year will be on the lines of the pre-war meetings in provincial cities. It will be held in London on July 20, at the British Medical Association's hall in Tavistock Square. Following the statutory meetings of the council and general committee, in the morning, there will be a discussion on the future activities of the Association, based on a previously circulated statement on "The Future Pattern of the British Association." Empire and foreign delegates will be received as guests at luncheon at Claridge's Hotel and in the afternoon there will be a general meeting, when Sir Richard Gregory, Bt., F.R.S., will deliver his presidential address on "Civilisation and the Pursuit of Knowledge." An informal reception by the president and council will be held in the evening and the next day delegates will be entertained at Down House, the Kentish home of Charles Darwin, which the Association maintains as his memorial.

LETTER TO THE EDITOR

Measurement of Drugs

SIR.—The death of an hospital patient through a nurse's misreading of a prescription sign has led to the suggestion that the traditional symbols of the apothecary should now give way to the metric system. In fact the metric system is coming into use and its further employment depends on the extent to which physicians choose to adopt it in writing prescriptions.

How drugs are measured is not, however, the real issue. It is as easy to slip up over a decimal point as over a drachm loop. The real issue is who measures them. In the case in question a pharmacist would have realised that the quantity was greatly in excess of the proper dose. The law should forbid the dispensing of potent drugs in hospitals except by or under the supervision of a pharmacist and so dispense with the incompetent dispenser.—Yours faithfully,

F. C. WILSON

(Member of the Council of the Pharmaceutical Society of Great Britain).

London, S.W.

June 12.

A CHEMIST'S BOOKSHELF

DDT : THE SYNTHETIC INSECTICIDE. By T. F. West and G. A. Campbell. London: Chapman & Hall. Pp. 301. 21s.

SOME PROPERTIES AND APPLICATIONS OF DDT. London: H.M.S.O. Pp. 34. 6d.

The long-awaited authoritative work on DDT by the two chemists who have devoted their time and energy especially to the introduction into Britain of this remarkable insecticide is at length available. It may be said at once that the volume is in every way of the high standard expected, and the demand is certain to be many times larger than the publishers are likely to be able to cope with within the limits of a single edition in these days of paper restriction and printing difficulties.

This is indeed a book that should be in the hands of every agriculturist and every chemist; and it is no exaggeration to say that all up-to-date physicians and veterinary surgeons should likewise secure a copy.

Much of the information contained in the book has been summarised in the pages of *THE CHEMICAL AGE* (1944, 51, 245; 1945, 53, 291), though necessarily in abbreviated form, and the chapters in the present volume on the History and Development and on the Chemistry and Manufacture of DDT deserve to be read with the greatest care, not merely for the obvious value of the facts, but also because of their intrinsic interest. A point that emerges, on the historical side, is the patience and determination of the Swiss chemists of the Geigy Company, headed by Dr. P. Luger, in developing a type of chemical which was found to "do something" to the living organism. The sequence of the Basle researches is a classic in its particular field.

Special attention is given to the question of toxic manifestations, and the fact emerges, not altogether surprisingly, that you can poison yourself—or an experimental animal—with DDT if you try. Large amounts of DDT must be applied to the skin or given by the stomach to produce fatal results; but even repeated exposures to DDT mists over a long period produced no signs of poisoning or skin irritation on the part of workers wearing the customary protective clothing. The dry powder, moreover, is very meagrely absorbed and is non-irritating to the skin. These are a few facts selected at random from a fully documented study.

Later chapters consider the application of DDT in sundry materials, and—perhaps to the layman the most important side of the question—its effect on lice and mosquitoes and on insect pests generally. The other side of the medal is not neglected, namely, the effect of DDT on beneficial insects. Workers in the DDT field have repeatedly emphasised the dangers of upsetting the bio-

logical balance between good and bad insects, and at the present stage the information on this subject appears somewhat inadequate. Further details, in a later edition, will be welcome.

Little more remains to be said, except that the make-up of the book is most pleasing. The illustrations are highly effective, the indexes have stood up well to the tests applied to them, and the chapter-headings provide an agreeable note of quiet humour.

The handy little monograph issued by the Ministry of Supply and published by the Stationery Office provides an excellent summary of information on the practical applications of DDT, compiled both from the published literature and from reports held by Government departments. Naturally, it does not include references to the work of West and Campbell reviewed above, but its authors have had access to much the same information. Its special value lies in its brevity and compactness; a practical purpose rather than a detailed study has been the aim, and the target has been pretty well hit. There are some excellent "do's and don'ts" and a very useful appendix summarising the results of field trials on various insects and other arthropods.

Chemicals for Austria

Manufacturers Look to Britain

BRTAIN is the only nation from which Austria will be able to import her requirements of chemical supplies, according to the Viennese journal *The Chemical Worker*. The liquidation of the I.G. Farben concern has cut off the former source of supply, and the Austrian Donauchemie A.G. will need large imports of raw materials in order to build up her own production.

The pharmaceutical, paint, print-dyes, textile, paper, and food industries are all in desperate need of supplies to maintain any reasonable standard of production. Lenzingers Zellwolle A.G. have already stated that there is a danger of having to close down entirely if raw materials are not soon forthcoming.

There is little hope of supplies from Continental sources. The Swiss concerns of Sandoz, Ciba, and Geigy prefer to deal with countries able to pay in gold, and the French firms of Kuhlmann and others are fully committed to internal demands. American supplies are out of the question because of the transport difficulties. The British I.C.I. are the only manufacturers in a position to supply the necessary chemicals on credit, says *The Chemical Worker*. The question of prices will be a matter for negotiation, but hope is expressed that Britain will help in Austrian recovery in this direction.

General News

From Week to Week

The Electrodepositors' Technical Society announces that the third international conference on electrodeposition will be held in London in May, 1947.

The Institute of Export, on June 24, is removing from the Royal Empire Society Building, Northumberland Avenue, to Holland House, 140 Cromwell Road, London, S.W.7. (Telephone, WEStern 3128.)

The 150th anniversary of the formation of Newton Chambers & Co., Ltd., will be celebrated during the first week in July, when nearly one thousand employees will co-operate in producing a pageant in Sheffield.

The Manchester Group of the International Society of Leather Trades Chemists recently heard an interesting talk by Mr. R. Withinshaw on his impressions of German tanneries, and the chairman, Mr. C. F. Heal, enlarged on a second aspect of the subject from his own experiences.

"Introductions to Science" is the general title of a new series of books which is shortly to be published by Sigma Books, Ltd., with the purpose of explaining in simple language the theoretical and practical aspects of modern science, medicine, and technology.

At the annual general meeting of the Institute of Welding in London on June 5, the retiring president, Mr. W. W. Watt, managing director of the British Oxygen Co., Ltd., in responding to a vote of thanks for his past services to the Institute, gave an account of his recent tour of Australia and New Zealand and of the development of welding in those countries.

Plans for processing flexible synthetic resins by the Dunlop Rubber Co. were announced by the chairman, Sir George Beharrell, at the annual general meeting. The company, which has carried out considerable experiments on these resins, will manufacture from them such products as come within their scope. A new subsidiary company called Dunlop's Special Products, Ltd., will handle this new enterprise.

Wholesale prices in May, as measured by the Board of Trade index number, were 0.3 per cent. higher than in April. The index of industrial materials rose by 0.4 per cent., the main influencing factor being a rise of 2.6 per cent. recorded for the non-ferrous metals group as a result of price changes which occurred in April. The "chemicals and oils" index was raised slightly by the carry-over from April of an increase of about 1 per cent. in the average price of white lead paint.

The papers read at the conference held under the auspices of the Association of Scientific Workers in London on February 15-17 have been published in book form, with the title *Science and the Welfare of Mankind*. The price is 2s. 6d.

The chemical industry has been informed by the Minister of Labour that firms engaged in the manufacture of fertilisers or heavy chemicals will be removed from the Essential Work Order, along with the rest of the chemical industry, on or about June 29. The ball-clay and glass industries will be de-scheduled about the beginning of September; individual undertakings will be given at least one month's notice.

At the annual general meeting of the Macaulay Institute for Soil Research, held at Craigiebuckler recently, reference was made to the future organisation of spectrographic work in Scotland, based upon existent facilities at the Macaulay Institute. In a review of recent work, mention was made of advances in geochemical and spectroscopic studies and of chemical and microbiological investigations of soil organic matter.

Official notice has been given of the intention of the Secretary of State to make Rules amending the Poisons Rules, 1935, and an Order amending the Poisons List. Copies of the proposed amending Rules and Order may be obtained from H.M. Stationery Office (price 2d.). Any representations in regard to the proposals should be addressed to the Under Secretary of State, Home Office, St. Stephen's House, Victoria Embankment, London, S.W.1.

A fire which threatened the main part of the Normanby Park Tar Supply Company's plant at Scunthorpe on Tuesday last week was fought by the N.F.S. for over an hour. A broken nipple on a stopcock on one of the tar boilers allowed tar to run down to the boiler fire. The flames began spreading along the ground towards a store of naphthalene and several more boilers near by were in danger. Sand and foam sprays were used to bring the fire under control.

The British Baking Industries' Research Association has been formed as a company limited by guarantee, with an unlimited number of members, each liable for £5 in the event of winding up. Among the subscribers to the memorandum of association are represented a large number of important manufacturing baking companies in Great Britain and Northern Ireland. The management is vested in a Council, of not less than 13 nor more than 20 members. The Minister of Food may, on the invitation of the Council, appoint an additional member.

The Board of Trade has issued two Statutory Rules and Orders, 1946 (Nos. 816 and 817), which have the effect of removing the controls under the Trading with the Enemy Act in respect of money and property accruing on or after June 6, 1946, to persons resident in French Indo-China.

Foreign News

The Argentine linseed crop for the 1945-46 season amounted to 964,100 metric tons, which exceeds last year's yield by 177,500 tons.

The American Chemical Society, which recently held its first post-war meeting, now has more than 44,000 members, as compared with 122 when it was formed 70 years ago.

An extensive survey, covering about 450 sq. miles of territory in the Flinders range in Southern Australia, is to be undertaken to ascertain the value and extent of uranium deposits.

A plant producing alcohol from about 3500 barrels of potatoes daily for the Clarke Distillery, Ltd., has gone into operation in Aroostook County, Maine, U.S.A. A reserve supply of potatoes, for use in the late summer, is to be dehydrated and stored.

A bromine product, now manufactured commercially for the first time, is 2-bromothiophene, which is being produced by the Michigan Chemical Corporation, St. Louis, Michigan, U.S.A. It is of value as a pharmaceutical intermediate.

The History of Chemistry Division of the American Chemical Society, suspended during the war, has been revived, and held a successful joint meeting with the Division of Chemical Education at the recent Atlantic City meeting.

A new cement factory in the neighbourhood of Antofagasta will be operated by a company formed with Chilean and foreign capital. Modern equipment has been acquired in the U.S.A. and the new plant is expected to provide work for 1200.

One of the largest hydro-electric centres in Europe is to be built in the Moldavia province of Rumania by a newly-formed joint American-Russian-Rumanian company, which, in addition to the generation of electric energy, will make cellulose from reeds and rushes amply available in the Danube delta.

A committee is to be set up to examine programmes of expenditure under the £3,500,000 regional allocation to East Africa from the Colonial Development and Welfare Fund. The East African Governors' Conference has accepted a proposal that a sum of £350,000 should be earmarked for the production of phosphatic fertiliser in Uganda, subject to the presentation of a scheme acceptable to the East African Governments.

Brazil's total production of vegetable oils increased from 103,000 metric tons in 1938 to 163,000 tons in 1944, according to official statistics. Cotton-seed oil ranks as the chief item of this group with a proportion of 64 per cent. of the total volume of vegetable oils produced.

Production of tin concentrates in Malaya during the first quarter of 1946, according to the bulletin of the Chief Inspector of Mines in Malaya, amounted to 802 tons (tin content). About half of this quantity was obtained from hand-washing, and the remainder mainly from Chinese-operated gravel pump mines.

A new laboratory, to investigate the problems of metal corrosion, has been set up by the Dow Chemical Co., of America. The development of magnesium for cathodic protection will receive special attention. Results so far achieved in this field indicate that magnesium protection is extremely suited to pipe-lines, cable sheathing, oil and water tanks, heaters, etc.

The U.S.A. War Assets Administration announces that two steel works—Homestead, at Munhall, Pa., and Duquesne, Pa.—representing a combined Federal Government investment of \$100,000,000, are on the market for sale or lease. Both properties are being operated on an interim lease basis by the Carnegie-Illinois Steel Corporation and have an annual output of about 2,000,000 tons of alloy steel ingots. The W.A.A. also wants to sell or lease the South Chicago steel plant, now operated by Republic Steel Corporation.

Forthcoming Events

June 24. Association of Austrian Chemists, etc., in Great Britain. 69 Greencroft Gardens, London, N.W.6, 7.30 p.m. Professor Gross: "Production of Metals by Distillation."

June 27. Association of Special Libraries and Information Bureaux (Northern Branch). Central Library, St. Peter's Square, Manchester, 3 p.m. Inaugural meeting. Miss M. Exley: "Co-operation between Libraries in the Northern Region."

Company News

Greef-Chemicals Holdings, Ltd., report net profit of £22,578 for 1945, as against £20,938 for the previous year. A final ordinary dividend of 7 per cent., plus bonus of 2½ per cent., makes 12½ per cent. for the year (10 per cent.).

British Drug Houses, Ltd., report that net profit for 1945 was £42,284, as compared with £37,159 the previous year. Ordinary dividend, at 6 per cent., is 2 per cent. higher.

Subject to consent being obtained to a proposed increase of capital, it is intended to offer new shares in the first instance as rights to the present shareholders. Resolutions increasing the authorised capital of the company by the addition of 175,000 £1 five per cent. cumulative preference shares and 400,000 ordinary £1 shares were to be submitted to meetings of shareholders immediately after the annual meeting, which was held on Thursday (after we had gone to press).

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

ANSELL JONES & CO., LTD., Walsall, metal founders. (M., 22/6/46.) May 20, £4000 debentures and £15,000 debentures; general charges. *£6000. December 31, 1944.

New Companies Registered

Hamer Products, Ltd. (412,232).—Private company. Capital £1000 in £1 shares. Manufacturing, research, dispensing and analytical chemists and druggists, manufacturers of and dealers in polishes, etc. Directors: L. Hamer, D. Hamer. Registered office: 20 Brazennose Street, Manchester.

Combined Toolmakers, Ltd. (412,114).—Private company. Capital £200 in £1 shares. Precision, constructional, electrical and chemical engineers, tool and machine makers, etc. Directors: G. Cocking, R. Anderson. Registered office: 1 Quality Court, Chancery Lane, London, W.C.2.

Anglo-French Distributors (Chemical Co.), Ltd. (412,191).—Private company. Capital: £1000 in £1 shares. Dealers in merchandise of all kinds, including chemicals, etc. Subscribers: A. C. Wilfred, J. C. Crout. Solicitors: Stone & Stone, 69 Moorgate, London, E.C.2.

Dunlop Special Products, Ltd. (412,301).—Private company. Capital £50,000 in £1 shares. Manufacturers of and dealers in rubber, balata, gutta percha and plastic goods; chemists, druggists, oil and colour men, etc. Subscribers: C. H. Treble, L. A. J. Newell. Registered office: 1 Albany Street, N.W.1.

Barrywald Products, Ltd. (412,196).—Private company. Capital £500 in £1 shares. Manufacturers of and dealers in electrical and chemical equipment, makers of chemical plant and materials, laboratory fittings, etc. Directors: D. Barrington, H. G. Waldem, H. E. C. Huber. Registered office: 47 Oxford Street, London, W.1.

Jencons (Scientific), Ltd. (412,234).—Private company. Capital £2000 in £1 shares. To acquire the business of a laboratory furnish and general glass merchant, etc., heretofore carried on by Reginald W. Jennings at 425 Kingsbury Road, N.W.9, as "Jencons." Subscribers: R. W. Jennings, J. W. Pearce. Solicitors: Samuel J. Weaver, 30 Clarendon Road, Watford.

Scientific Exports (Gt. Britain), Ltd. (412,460).—Private company. Capital £10,000 in £1 shares. To adopt an agreement with Allen & Hanburys, Ltd., Adam Hilger, Ltd., Baird & Tatlock (London), Ltd., Hopkin & Williams, Ltd., W. Watson & Sons, Ltd., and E. R. Watts & Son, Ltd.; and to carry on the business of manufacturers of scientific instruments, etc., fine chemicals and analytical reagents, etc. Directors: J. E. C. Bailey (director of Baird & Tatlock (London), Ltd.); W. E. Watson-Baker (director of W. Watson & Sons, Ltd.); G. T. Gamble (director of Allen & Hanburys, Ltd.); C. L. Prior (director of Hopkin & Williams, Ltd.); D. R. Stanley (director of E. R. Watts & Son, Ltd.); and F. Twyman (director of Adam Hilger, Ltd.). Registered office: 17 Throgmorton Avenue, E.C.2.

Chemical and Allied Stocks and Shares

THERE has again been a cheerful undertone in stock markets, buyers predominating, although in most sections business was only moderate. British Funds held firm and industrial shares were again responsive to satisfaction with the majority of dividend announcements that have come to hand. A better tendency in the nationalisation groups was attributed to the special payment made by Cable & Wireless (Holding) as this has strengthened the view that, where possible, iron, coal and steel companies are likely to follow a somewhat more liberal dividend policy than in recent years, when, owing to war-time uncertainties, a good proportion of profits was added to reserve funds. Generally, industrial shares have been unaffected by the statements at the Labour Party conference indicating that the Government has in mind further schemes of public control when the present big nationalisation projects have been passed into law. It is noticeable, however, that investment buying has again centred on securities of companies

considered to be outside the nationalisation threat.

Chemical and kindred shares have generally held recent gains, Imperial Chemical being 45s. and B. Laporte higher at 97s. 6d. on the latest developments, while Fisons have changed hands up to 63s. Turner & Newall, however, came back to 94s. xd. in the absence of an increase in the interim dividend, and Lever & Unilever at 56s. 9d. were slightly less firm. On the other hand, shares of companies connected with the building sections were inclined to improve, Associated Cement being prominent with a further advance to 72s. 9d. British Plaster Board were 37s. 9d. and Allied Ironfounders 58s. 9d.

British Drug Houses were outstanding with a sharp advance to 73s. 9d. on the news that permission is being sought to offer additional shares to shareholders, more capital being required to expand manufacturing facilities to meet increased demand. It is added by the directors that the need for more capital has arisen from the draining away of normal profits by E.P.T. In other directions, Dunlop Rubber at 73s. have further advanced, sentiment reflecting the statements at the annual meeting and the debenture issue and conversion proposals. The units of the Distillers Co. were prominent with a fresh rise to 133s. 6d., pending the dividend announcement. British Glues & Chemicals 4s. ordinary rose to 15s. on dividend hopes, while Blythe Colour 4s. shares remained active, dealing ranging over 49s. The latter company is among those likely to benefit materially from the withdrawal of E.P.T. at the end of the year. Beechams deferred have been prominent with a further rise to 27s., partly in recognition of the widening basis of the company's business and partly because of future benefits from the withdrawal of E.P.T. Barry & Staines strengthened to 61s. 9d. on the victory bonus.

Iron and steel shares were better in some instances. Babcock & Wilcox further improved to 66s. as the company is considered in the market to be outside the Government's nationalisation proposals. Whitehead Iron were better at 83s. and Ruston & Hornsby 68s. 6d., while T. W. Ward improved to 43s. 9d., and William Beardmore were better at 31s. Textiles have been quietly firm, with Bleachers at 14s. 7½d. recovering part of the fall which followed the lower profits for the past year. In other directions, Amalgamated Metal at 21s. 9d. were again better. British Aluminium were 42s. 9d. and British Match held their rise to 50s. 6d., while Borax Consolidated have been firm at 49s.

Oils became reactionary, Shell, Burmah Oil, and Anglo-Iranian moving back, the tendency in this section being to await international political developments.

British Chemical Prices

Market Reports

INQUIRY on the London general chemicals market during the week has covered a fairly wide range of materials and bookings for spot or near delivery dates are difficult to negotiate. Deliveries against existing contracts are reported to be satisfactory and replacement orders are coming through steadily. All the soda products are in steady demand and a firm undertone prevails among the potash compounds. In other directions, formaldehyde is a good market and there is a strong request for white powdered arsenic. Most of the paint raw materials have been in active demand and the price position generally remains on a firm basis. There is little to report on the coal-tar products market, where most products are sold well forward.

MANCHESTER.—Trade in the general run of both light and heavy chemical products on the Manchester market this week has opened steadily after the hold-up during Whit week. Deliveries of the soda compounds and of ammonia and magnesia products, as well as of the mineral acids, have been going forward satisfactorily against contracts to home consumers, while shipments overseas amount to a substantial aggregate tonnage. Fresh bookings, both on home account and for export, have been on fairly steady lines. Sulphate of ammonia, superphosphates and certain other classes of fertilisers are in steady demand. Most of the leading tar products are finding a ready outlet on the home market, and in cresylic acid and one or two other lines a steady export trade is being done.

GLASGOW.—Home trade inquiries and orders in the Scottish heavy chemical market have been up to standard during the past week with prices on the upgrade on account of forthcoming freight increases. Supplies generally are short and deliveries are well behind. In the export market some notable inquiries have been received for zinc oxide, fertilisers, formaldehyde, sulphur, and tar products. General export difficulties remain: viz., supplies which are quite unequal to the demand, shipping space, and export regulations.

Price Changes

Aluminium Sulphate.—MANCHESTER: £11 10s. per ton d/d.

Ammonium Bicarbonate.—MANCHESTER: £39 10s. per ton d/d.

Ammonium Carbonate.—MANCHESTER: Powder, £43 per ton d/d.

Copper Carbonate.—MANCHESTER: £8 5s. per cwt., d/d.

Lead Nitrate.—MANCHESTER: £53 10s. per ton d/d.

Salicylic Acid.—MANCHESTER: 1s. 8d. to 2s. 1d. per lb. d/d.

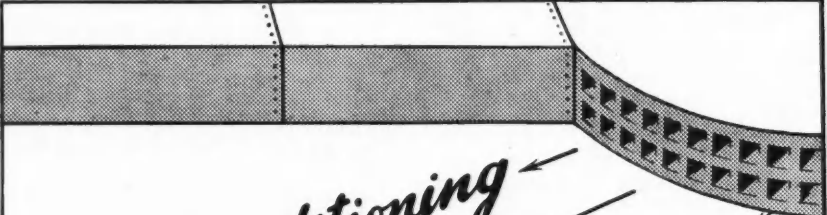
Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted may be obtained from the Patent Office, Southampton Buildings, London, W.C.2., at 1s. each. Numbers given under "Applications for Patents" are for reference in all correspondence up to acceptance of the complete specification.

Applications for Patents

Nitrile purification.—A. Abbey. (Armour & Co.) 15001.
 Centrifugal separators.—A/B Separator. 15194.
 Contacting of solids with solids.—M. H. M. Arnold, and I.C.I., Ltd. 14952.
 Oil treatment.—D. Balachowsky. 14932.
 Alkyl phenols.—H. A. Basterfield, and I.C.I., Ltd. 14950.
 Sodium chromates.—G. A. Beeche. 14579.
 Organic compounds.—British Celanese, Ltd. 15043.
 Ketene.—British Industrial Solvents, Ltd., and E. C. Craven. 14937.
 Resinous compositions.—British Resin Products, Ltd., E. M. Evans, and H. Thurston-Hookway. 14534.
 Dyestuffs.—Ciba, Ltd. 15223-4.
 Dyestuffs.—S. Coffey, D. A. W. Fairweather, F. Lodge, J. Wardleworth, and I.C.I., Ltd. 15187.
 Acetylsalicylic acid.—M. Coplans. 15065.
 Furnaces.—W. Cowlishaw. 14633.
 Filtration.—S. G. Dehn. (General American Transportation Corp.) 15226.
 Polymers.—J. Downing, and M. H. Wilcox. 14858.
 Opaque materials.—T. Downing, W. E. F. Gates, and I.C.I., Ltd. 14954.
 Polymeric materials.—J. G. N. Drewitt, and J. Lincoln. 15268.
 Nickel base alloys.—Elgin National Watch Co. 14900.
 Centrifugal separators.—H. W. Fawcett. 15029.
 Alkylation of phenols.—J. E. Fearey, and I.C.I., Ltd. 14951.
 Fertilisers.—W. Fux. 15070.
 Coating materials.—W. E. F. Gates, and I.C.I., Ltd. 14953.
 Dyestuffs.—J. R. Geigy A.G. 14671.
 Liquid purifying plant.—Houseman & Thompson, Ltd., and R. W. Groom. 14851.
 Separation of metals from alloys.—Indian Standard Metal Co., Ltd., and A. Schwarz. 14957.
 Testing of detergent solutions.—Industrial & Scientific Instruments, Ltd., and S. J. Ward. 15096.
 Fuel consumption measuring.—C. N. Jaques. 14540.
 Froth treatment.—Kodak, Ltd. 14901-2.
 Purification of halogens.—Krebs & Co. 14762.
 Diazotype materials.—Lawes Bros., Ltd., L. F. W. Lawes, and G. W. Lawes. 14488.
 Bleaching of oils, etc.—Lever Bros. & Unilever, Ltd. 14630.
 Fluid flow indicators.—Liquidometer Corporation. 14654.

Magnesium.—Magnesium Elektron, Ltd., and A. B. Lisle. 14946.
 Magnesium base alloys.—Magnesium Elektron, Ltd., A. C. Jessup, and J. B. Wilson. 14945.
 Magnesium base alloys.—Magnesium, Elektron, Ltd., E. F. Emley, A. C. Jessup, and P. A. Fisher. 14948.
 Magnesium base alloys.—Magnesium, Elektron, Ltd., C. J. P. Ball, A. C. Jessup, E. F. Emley, and P. A. Fisher. 14947.
 Fluxes.—Mathieson Alkali Works. 15051.
 Dyestuffs.—P. May. (Sandoz, Ltd.) 14542.
 Pressure fluid mechanism.—T. E. Mead. 14653.
 Valves.—E. K. Moessmer. 15209.
 Hardness-testing apparatus.—E. K. Moessmer. 15210.
 Welding electrodes.—Mond Nickel Co., Ltd. 14860.
 Heat-resisting alloys.—Mond Nickel Co., Ltd., and L. B. Pfeil. 14863.
 Liquid circulation.—H. G. Montgomery. 14852-3.
 Ascorbic acids.—N.V. De Bataafsche Petroleum Mij. 14729.
 Emulsions.—N.V. Organon. 14872.
 Plastic materials.—N.V. Philips' Gloeilampenfabrieken. 14695, 14980.
 Fluid flow meters.—P. E. Negretti, P. A. Negretti, P. N. Negretti (trading as Negretti & Zambra), and H. W. Ibbott. 14849-50.
 Electrolytic condensers.—J. R. Packman, W. E. Pagram, and Plessey Co., Ltd. 15106.
 Hard metal carbides.—E. A. Pokorny. 14535.
 Fertilisers.—J. W. R. Rayner, and I.C.I., Ltd. 14955.
 Stable cysteine preparations.—Roche Products, Ltd. 14605.
 Sintering apparatus.—O. Rolfsen. 14557.
 Bi-metal articles.—Sheepbridge Stokes Centrifugal Castings Co., Ltd., M. M. Hallett, and H. Padgett. 15274.
 Anodic polishing methods.—Soc. Française Hispano-Suiza. 14741.
 Synthetic fuel.—N. A. Stewart. 14889.
 Centrifugal separators.—J. R. Dunbar-Sutherland. 14728.
 Cellulose ethers.—Sylvania Industrial Corporation. 14935.
 Tyrothricin.—T. White, J. C. Appleby, E. Knowles, and J. Wyeth & Bro., Ltd. 14726.
 Penicillin.—T. White, J. J. Gordon, E. Knowles, and J. Wyeth & Bro., Ltd. 14727.
 Organic compounds.—American Cyanamid Co. 15779.
 Thiouracils.—American Cyanamid Co. 15780.



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Ethylene compositions.—American Cyanamid Co. 15326/7.

Cyclohexane separation.—Anglo-Iranian Oil Co., Ltd., S. F. Birch, F. A. Fidler, and C. B. Collis. 15841.

Xylidines.—Anglo-Iranian Oil Co., Ltd., S. F. Birch, F. A. Fidler, and R. A. Dean. 15849.

Diolefines.—C. Arnold. (Standard Oil Development Co.) 15422.

Complete Specifications Open to Public Inspection

Producing a dibasic product of 2-sulphanylamino-pyrazine.—Abbott Laboratories. May 10, 1943. 11652/44.

Alkamine esters of 1-alkyl-2,5-dimethylpyrrole-3,4-dicarboxylic acid.—American Cyanamid Co. July 31, 1943. 11910/44.

Penicillin-containing therapeutic compositions and the preparation and use thereof.—American Cyanamid Co. Nov. 15, 1944. 27710/45.

Asbestos yarns.—American Viscose Corporation. May 29, 1943. 8761/44.

Pulverising plant.—Babcock & Wilcox, Ltd. May 22, 1943. 9546/44.

Mixing machines.—British Celanese, Ltd. Nov. 15, 1944. 30593/45.

Manufacture of regenerated cellulose sheets, films, filaments, threads, and the like produced from viscose.—British Cellophane, Ltd. April 24, 1943. 7365/44.

Production of moisture-proof sheet or film.—British Cellophane, Ltd. Nov. 17, 1944. 30184-85/45.

Liquid hydrocarbon compositions.—British Thomson-Houston Co., Ltd. November 15, 1944. 30281/45.

Centrifugal compressors.—British Thomson-Houston Co., Ltd. Nov. 18, 1944. 30629/45.

Abrasive articles.—Callite Tungsten Corporation. Sept. 10, 1942. 10982/43.

Electrodeposition of iron.—Champion Paper & Fibre Co. Feb. 25, 1943. 6766/44.

Gas-tank vats for methane fermentation of manure and other analogous substances.—G. L. R. Ducler, and M. A. Isman. June 5, 1941. 9890/46.

Obtaining a combustible gas by fermentation of organic matter.—G. L. R. Ducler, and M. A. Isman. Mar. 28, 1942. 9891/46.

Purification of alkyl methacrylates.—E. I. Du Pont de Nemours & Co. July 13, 1943. 13402/44.

Compositions comprising acrylonitrile polymers and copolymers and shaped articles produced therefrom.—E. I. Du Pont de Nemours & Co. Nov. 18, 1944. 30990-92/45.

1-Substituted-2,5-diket-7-methyl-pyrimidopyrazoles and process of preparing the same.—General Aniline & Film Corporation.—Nov. 17, 1944. 27206/45.

Anti-stain agents for silver bleach solutions.—General Aniline & Film Corporation. Nov. 17, 1944. 28465/45.

Lubricating oils.—Imperial Chemical Industries, Ltd. May 1, 1943. 8124/44.

Solutions of synthetic linear polyamides.—Imperial Chemical Industries, Ltd. June 10, 1943. 11193/44.

Manufacture of rubber.—Imperial Chemical Industries, Ltd. June 23, 1943. 11944/44.

Compositions adapted for water-repellency treatment of textile fibres.—Imperial Chemical Industries, Ltd. Nov. 15, 1944. 30440/45.

Production of chlorine-containing formal, —Imperial Chemical Industries, Ltd. Nov. 17, 1944. 30989/45.

Transforming vanillin to vanillic acid.—Institute of Paper Chemistry. Nov. 20, 1944. 12993/45.

Preparation of organic fluorine compounds.—Kinetic Chemicals, Inc. Mar. 17, 1942. 8268/43.

Means for proportioning fluid and solid substances in particular liquids, fibre suspensions, dyes, chemicals, cement, and the like.—Kymen O/Y-Kymmene A/B. Nov. 17, 1944. 5134/46.

Separating gas mixtures.—Linde Air Products Co. Nov. 16, 1944. 23803/45.

Device for the separation of air from a flowing liquid.—J. Loder. July 6, 1939. 11251/46.

Preparing ketogulonic acid esters.—N.V. De Bataafsche Petroleum Mij. Jan. 7, 1944. 9696/46.

Preparing ascorbic acid from ketogulonic acid esters.—N.V. De Bataafsche Petroleum Mij. May 25, 1944. 9697/46.

Process for the catalytic aromatisation of aliphatic hydrocarbons.—N.V. De Bataafsche Petroleum Mij. Mar. 7, 1940. 9855/46.

Preparing 1-ascorbic acid from 1-keto-2-gulonic acid or derivatives thereof.—N.V. De Bataafsche Petroleum Mij. July 17, 1942. 9856/46.

Conversion of normal butane into isobutane.—N.V. De Bataafsche Petroleum Mij. June 14, 1944. 10095/46.

Process and apparatus for carrying out exothermic catalytic reactions in the vapour phase.—N.V. De Bataafsche Petroleum Mij. May 26, 1944. 10468/46.

Manufacture of aqueous dispersions of polymers of substances capable of polymerisation.—N.V. De Bataafsche Petroleum Mij. Oct. 24, 1942. 10469/46.

Production of penicillin.—C. Pfizer & Co., Inc. Dec. 7, 1943. 15774/44.

Alkylation of aromatic hydrocarbons.—Shell Development Co. Nov. 2, 1942. 19729/43.

Washing of gases under pressure with a view to the removal of carbon dioxide.—S.A. Appareils & Evaporateurs Kestner. Nov. 17, 1944. 7374/46.

Softening and de-aerating water and particularly boiler water.—Soc. Produits Chimiques de Ribecourt. Nov. 21, 1944. 28744/45.

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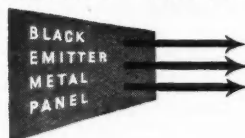
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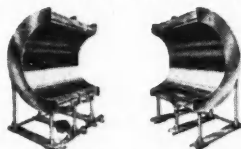
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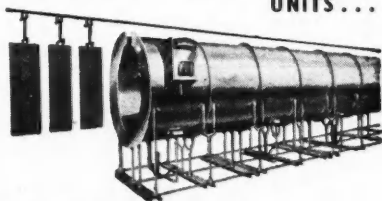
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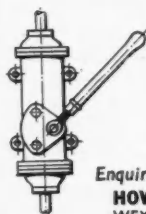
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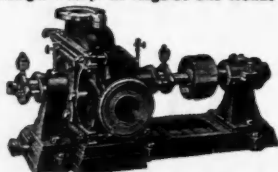
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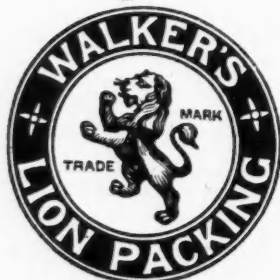
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